

INDEX TO ADVERTISEMENTS

In the "Canadian Architect and Builder."

Architectural
Sculptors..Modellers
Wood Carvers
etc...Dealers in
Maw & Co.'s
and Minton &
Co.'s Artistic and
Plain Tiles for Cabinets
Hearths, Floors, Etc.No. 296 King St. West
TORONTO
TELEPHONE 2490.

Established 1880.

GREATEST DURABILITY
SMALLEST COST
SUPERIOR EFFECT**MUIRHEAD'S
METAL WHITE**

This article, as its name implies, is a White Metallic Paint, ground in Pure Linseed Oil.
IT DOES NOT injure the Linseed Oil as all grades of White Lead do.
IT WILL NOT chalk nor flake off.
IT WILL NOT blacken in an impure atmosphere.
IT HAS greater spreading capacity than White Lead.
IT IS non-poisonous, being a perfect sanitary paint, IT IS more easily applied than White Lead.
IT IS unrivalled for painting the inside and outside of houses farm implements, boats, greenhouses, or any thing requiring paint.
BY ACTUAL TEST it has worn six times as long as pure White Lead on a floor—it is equally good for door steps and decks of vessels.
IT MAY be tinted to any shade.
IT IS the most important article introduced for painting in recent years.

... MANUFACTURED BY ...

Andrew MuirheadOffice, No. 82 Bay Street
Warehouse, Mincing Lane
Factory, St. Lawrence St. **TORONTO**

8371—Telephones—1936

The Roofers' Supply Co.
LIMITED

WHOLESALE AND RETAIL DEALERS IN ...
ALL KINDS OF ROOFING MATERIAL
Slate, Roofing Felt, Roofing Pitch, Terra Cotta
Tiles, Galvanized Iron, Sheet Copper, Slate Nails,
&c., &c., &c.
30 Widmer Street - **TORONTO**

Architects.
Ontario Directory... III
Quebec Directory... v**Architectural Sculptors and Carvers.**
Holbrook & Mollington... i**Architectural Iron Work.**Canada Foundry Co... vi
Dominion Bridge Co... i
Hamilton Bridge Works... IV
Watson, J. H... III**Art Woodwork.**
Southampton Mfg. Co. III**Architects' Supplies.**
Chas. Potter... iv**Builders' Supplies.**Bremner, Alex... 72
Johnston, J. D... v
Montreal Directory... vi
Ontario Lime Association... vii
Robertson & Co. D... vi
Rice Lewis & Son... IV
Toronto Directory... viii**Building Stone Dealers.**Amherst Red Stone
Quarry Co... vii
Credit Forks Stone Co... vii
Brodie & Son... vii
Hood & Son... vii
Kline John... vii
Pickard & Co... vii
Roberts & Co., D... vi
Samuel & Son Thos... vii**Builders' Hardware.**Rice Lewis & Son... IV
Vok's Hardware Co... 69
Wheeler & Bain... viii**Bricks.**American Enameled
Brick & Tile Co... i
Peasville Brick &
Terra Cotta Co... 71
Toronto Pressed Brick &
Terra Cotta Co... II**Chimney Top**

Morrison, J. H... 69

Contractors' Plant and Machinery

Rice Lewis & Son... IV

Cements.Bremner, Alex... 72
Owen Sound Portland
Cement Co... 72
The Rathbun Co... 72**Creosote Stains**

Cabot, Samuel... 69

Drain Pipe

Bremner, Alex... 72

ElevatorsFensom, John... I
Leitch & Turnbull... I
Malloch & Co... i
Miller Bros & Toms... iv
Turnbull & Russell Co... IV**Engravers.**

Can. Photo-Eng. Bureau... vi

Folding Partitions.

Springer, O. T... i

Grilles and Railings.Dennis Wire & Iron Co... iv
Toronto Fence & Ornamental Iron Works... iv
Southampton Mfg. Co. III**Granite**

Brunet, Jos... vii

Gas and Electric Fixtures

Black & Boyd Mfg Co... iv

Heating.Dominion Radiator Mfg. Co... i-ii
Gurney Foundry Co... iii
Ormsby & Co., A. B... I
Smart Mfg Co, Jas... vii
Reed & Co., Geo. W... II**Interior Decoration**

Elliott & Son Co... vi

Landscape Architecture

Frederick G Todd... III

Lime.Ontario Lime Association... viii
Robertson & Co... vii**Legal.**

Quinn & Morrison... III

Maniles, Grates, and Tiles.Holbrook & Mollington... i
Rice Lewis & Son... IV**Mail Chutes.**

The Cutler Mfg. Co... I

Mortar Colors and Shingle Stains.Cabot, Samuel... 69
Muirhead, Andrew... I**Ornamental Iron Work.**Dennis Wire & Iron Co... iv
Toronto Fence & Ornamental Iron Works... iv
Watson, John... III**Painters.**Montreal Directory... vii
Toronto Directory... viii**Prisms.**

Lyon, NT, Glass Co... 68

Paints & VarnishesCanada Paint Co... v
Imperial Varnish & Color Co... 70
Muirhead, Andrew... i**Parquet Floors**

Elliott & Son Co... iv

Plate GlassThe Consolidated Plate Glass Co... II
Toronto Plate Glass Co... iv**Plumbers**Montreal Directory... viii
Toronto Directory... viii**Reflectors**

Frink, I. P... III

Roofing MaterialsOrmsby & Co., A. B... I
Metallic Roofing Co... 71
Pedlar Metal Roofing Co... v
Preston Metal Shingle and Siding Co... 72
Roofers Supply Co... i**Roofers**Campbell & Gilday... v
Duthie & Sons, G... v
Douglas Bros... v
Forbes Roofing Co... vi
Nicholson & Co. D... viii
Rennie & Son, Robt... vi
Ormsby & Co., A. B... I
Ringham, George... viii
Stewart & Co., W. T. v ii
Williams & Co., H... viii**Stained and Decorative Glass**Bloomfield & Son, Henry... 72
Horwood & Sons, H... 72
Leonard, B... 72
Mackay Stained Glass Co... 72
McKenzie's Stained Glass Works... 72
The Robert McCausland Stained Glass Co... II**Shingles and Siding**Metallic Roofing Co... 71
Ormsby & Co., A. B... I
Pedlar Metal Roofing Co... v
Preston Metal Siding and Siding Co... 72
Roofers Supply Co... i**Soil Pipe.**

Toronto Foundry Co. III

Stairs

H. J. Amilton... 69

Tiles.

Lunn, Charles... II

School and Church Furniture.

Can. Office & School Furniture Co... III

Ventilators

Geo. W. Reed & Co... II

Valves

Jenkins Bros... IV

Wall PlasterAlbert Mfg. Co... vi
Bremner, Alex... 72**Wire Lathing**The B. Greening Wire Company... 69
Metallic Roofing Co... 71
Pedlar Company... v**Balanced Folding Partition Fixtures**

Our device secures EASY, POSITIVE and UNIFORM motion. The doors cannot bind, stick or twist. The partition is balanced in all positions. Adapted to new or old work. CATALOGUE ON APPLICATION.

O. T. SPRINGER, :: :: BURLINGTON, ONT.

ENAMELED BRICK (Royal Victoria Hospital, Montreal)**ENAMELED Subway Tile (Patented)****ENAMELED INTERLOCKING TILE (Substitute for Brick)****American Enameled Brick & Tile Co.,**

1 Madison Avenue, - - NEW YORK.

Send for Catalogue explaining Patents and their application; Color Sheets; Special Shapes; and extensive list of our past work (illustrated).

HUGH CAMERON
Canada Life Building, Montreal

Canadian Agent

WILLIAM MALLOCH & CO.
Electric Hydraulic Elevators
Steam Hand Power Elevators
Electric Dumb Waiters
LONDON, ONT.

SAFFORD

HOT WATER
and STEAM

RADIATORS

The "SAFFORD" Radiator is constructed with right and left screwed nipple connections, with large clear waterway. No bolts, packing or gaskets of any kind are used in the "SAFFORD" Radiator, consequently there is absolutely nothing to get out of repair.



They have been installed in many public buildings of importance in the British Empire and Continental Europe :

Her Majesty's Theatre, London.

Her Majesty's Office of Works, Birmingham.

Institute of Mechanical Engineers, Storey's Gate, Westminster.

Metropolitan Police Central Building, Gt. Scotland Yard, London.

Palace Hotel, Cairo, Egypt.

City Hall, Antwerp, Belgium.

City Hall, Pietermaritzburg, South Africa.

Exploration Buildings, Johannesburg, South Africa.

Royal Palace (Emperor's), Berlin, Germany.

Baron Thomas Mahs' Bank, Odessa, Russia.

All Government Buildings, Auckland, N. Z.



THE DOMINION RADIATOR CO., Limited

TORONTO, - CANADA.

The Largest Individual Radiator Manufacturers in the World.

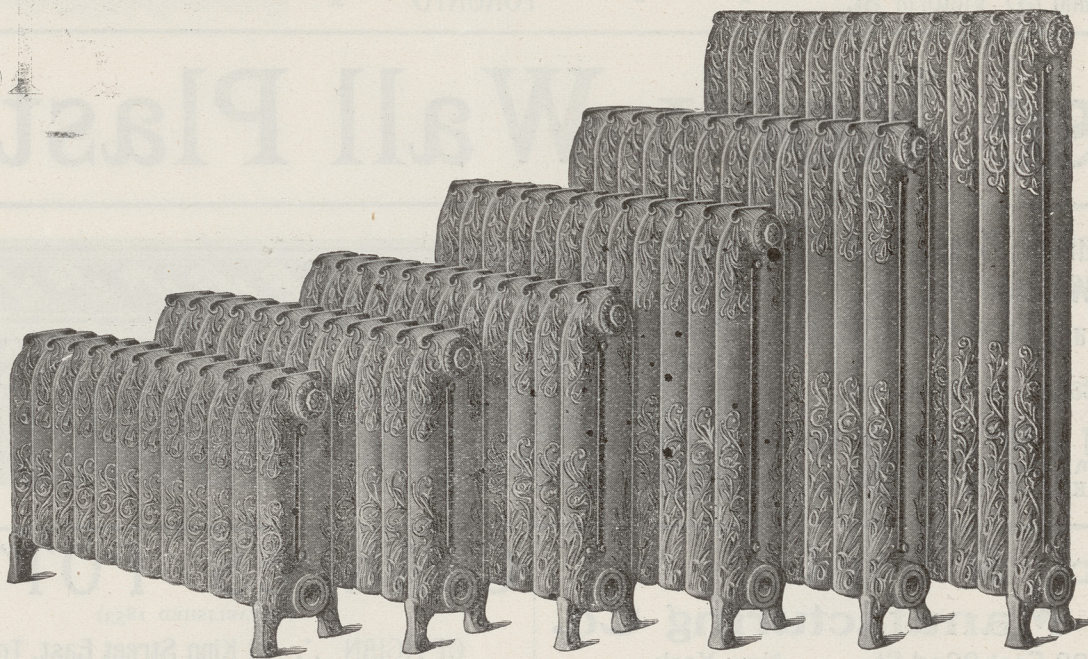
One Unique Feature

OF

OXFORD RADIATORS

For Hot Water or Steam

Is their iron to iron joints. No gaskets are used—leakage is impossible.



This is one reason of their universal popularity for every class of building. Practical builders and architects appreciate this mechanical excellence, as well as their artistic superiority.

They are made in sizes and shapes to suit any curve or corner of a modern building—made to adapt themselves to all architectural variations.

Our Catalogue gives complete information—have you one?

The Gurney Foundry Co., Limited

TORONTO

WINNIPEG

VANGOUVER

THE GURNEY-MASSEY CO., Limited - MONTREAL

ELEVATORS

Any desired capacity.

MILLER BROS. & TOMS
MONTREAL

Any service. Any motor.

BENT GLASS

MANUFACTURERS

FOR { **Shop Fronts**
House Windows
Show Cases

FINE BENT GLASS FOR CABINETS AND ART FURNITURE.

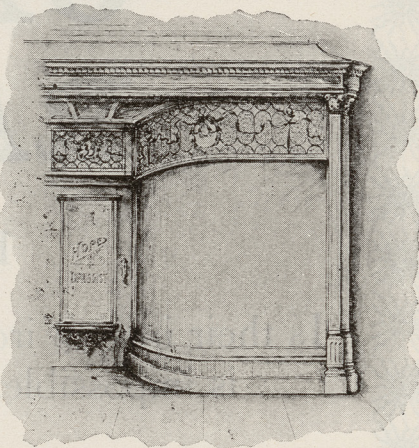
Toronto Plate Glass Importing Co.

ALL KINDS OF WINDOW GLASS.

135 and 137 Victoria St.

TORONTO

Refractory Glass TRANSOMS for Light Diffusion.



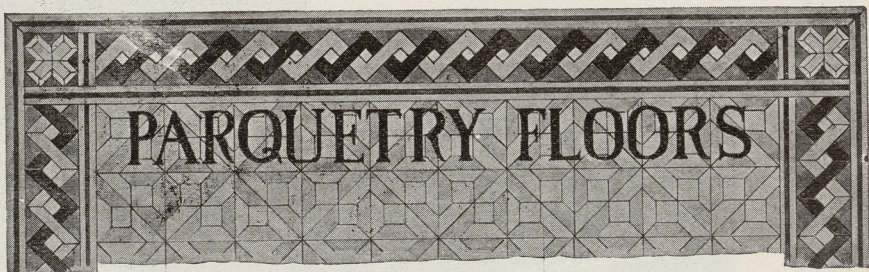
Use Rock Wall Plaster

Wood Carpet, Borders for Rugs
Wainscoting, etc.

Turned and Twisted Grille Work

Designs on application.

ELLIOTT & SON COMPANY, LIMITED
MANUFACTURERS
79 King St. West, TORONTO



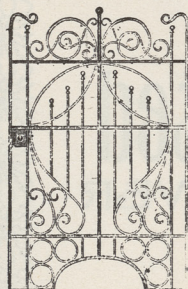
Black & Boyd
Manufacturing Co.

23 East 22nd St. - New York

Gas and Electric Fixtures

OF SUPERIOR WORKMANSHIP

Special Designs to harmonize with Interiors.
Complete scheme for Fixtures for Residences furnished
upon application from Owner or Architect.



Bank and Office Railings
Wickets, Grilles,
High-grade Metal Work
IN ANY FINISH.

Catalogue on Application.

DENNIS WIRE & IRON COMPANY
LONDON - ONT,

CHARLES POTTER

(ESTABLISHED 1853)

OPTICIAN . 31 King Street East, Toronto.

**Architects', Surveyors', Builders',
and Engineers' Requirements**

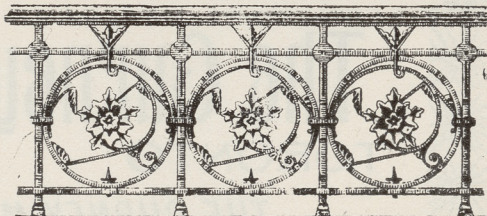
Drawing, Mathematical, Surveying and Philosophical Instruments,
Set Squares, Rules, Tape Lines, Spectacles, Eye-Glasses, Etc.

Repair Department on the premises, furnished with tools and all facilities to repair
and supply parts required in brass or glass. Skillful and experienced workmen
employed. The guarantee of an old established house that all goods sold will be
precisely as represented. Mail orders undertaken with care and faithfulness.
Enquiries cheerfully and promptly answered.

TORONTO FENCE & ORNAMENTAL IRON WORKS

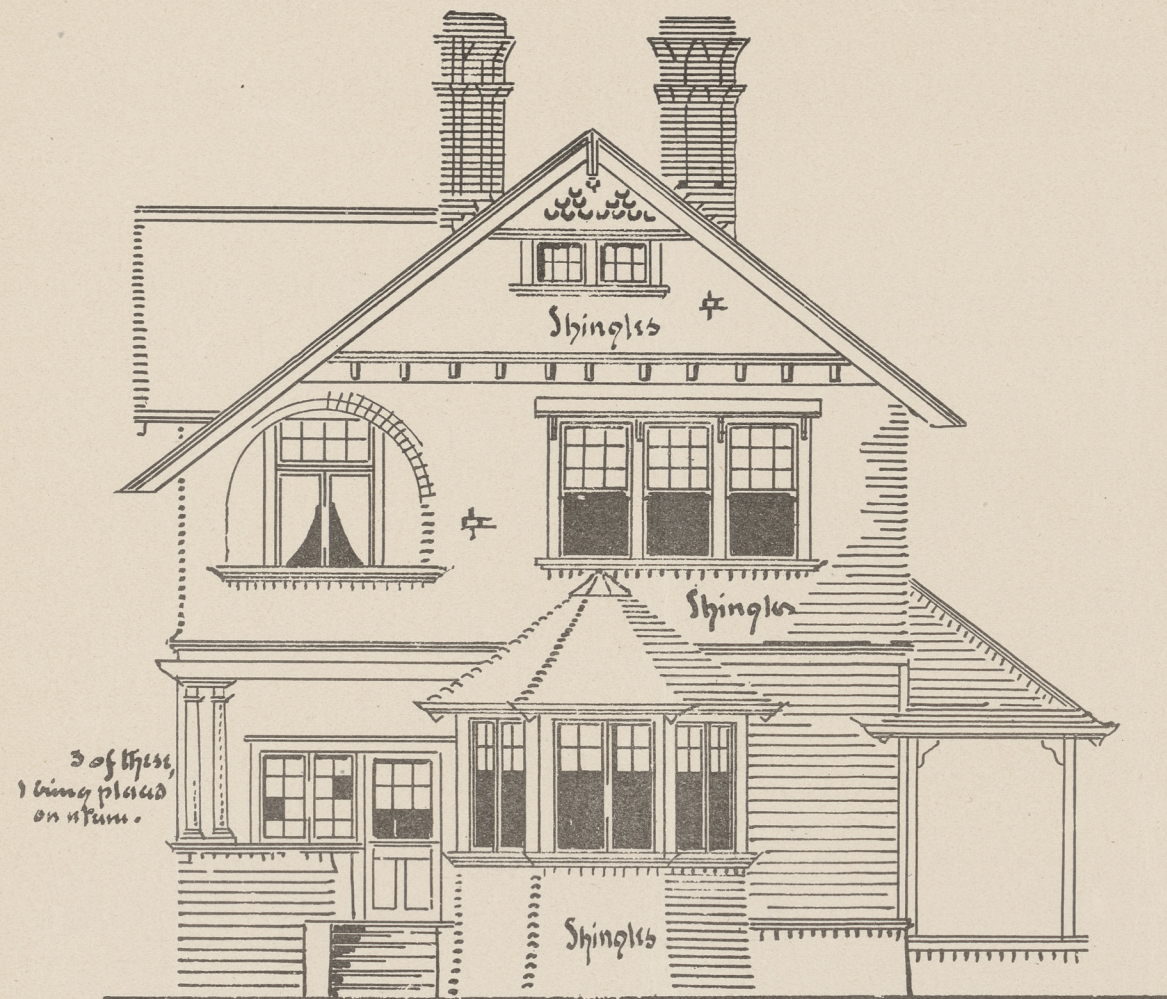
Contractors
for.....

**IRON
STAIR-
CASES**

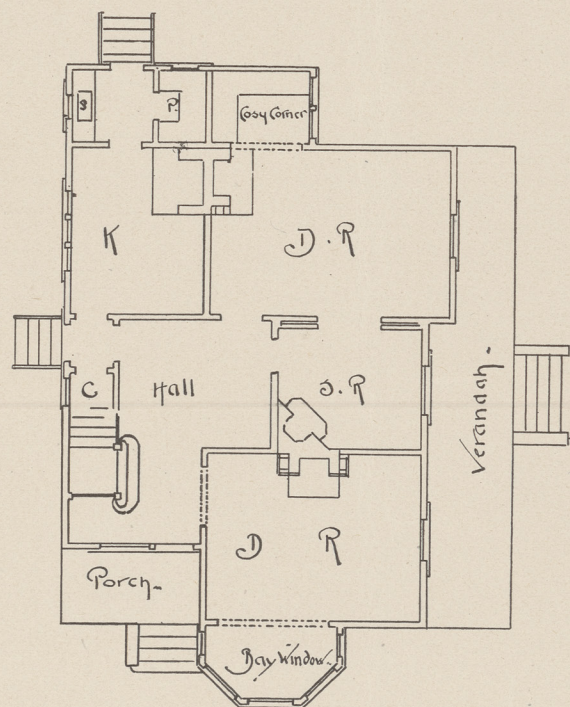


NEW COURT HOUSE, TORONTO

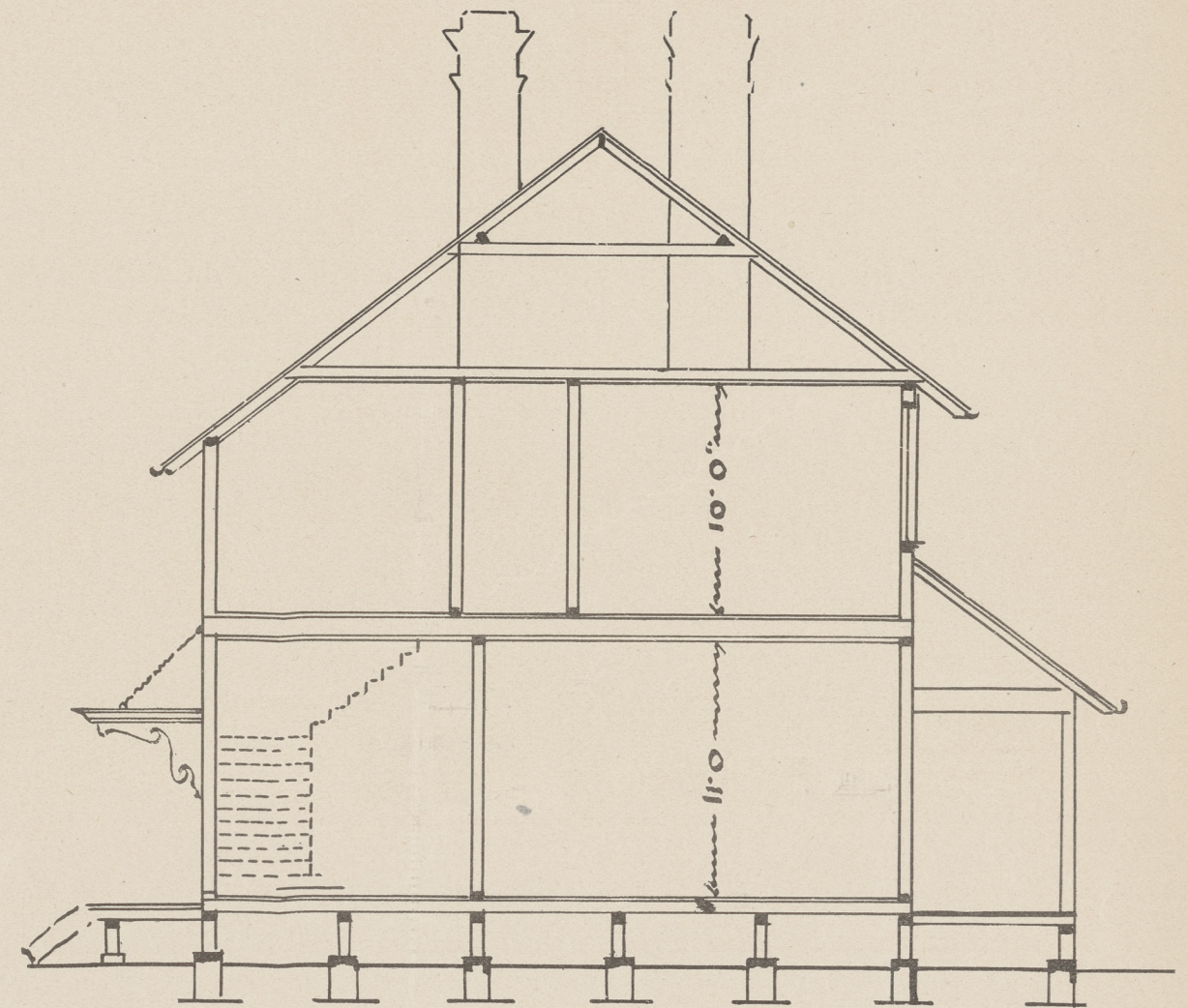
Estimates given for work in Iron, Brass or Bronze. **JOSEPH LEA, Mgr.**
'Phone 15 99 and 101 Queen St. East, TORONTO



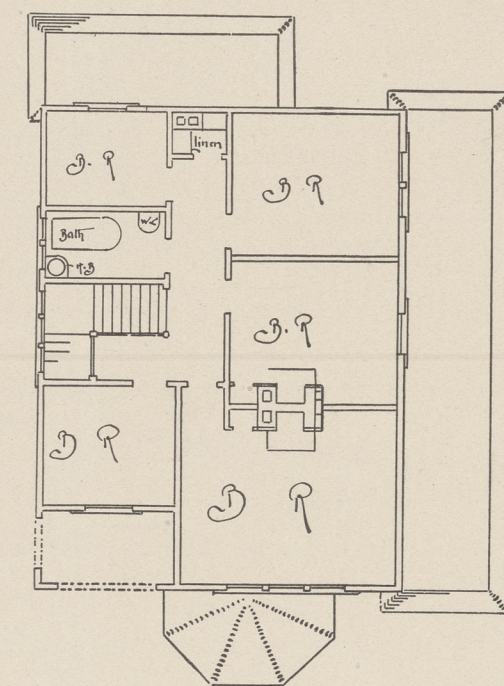
Front Elevation



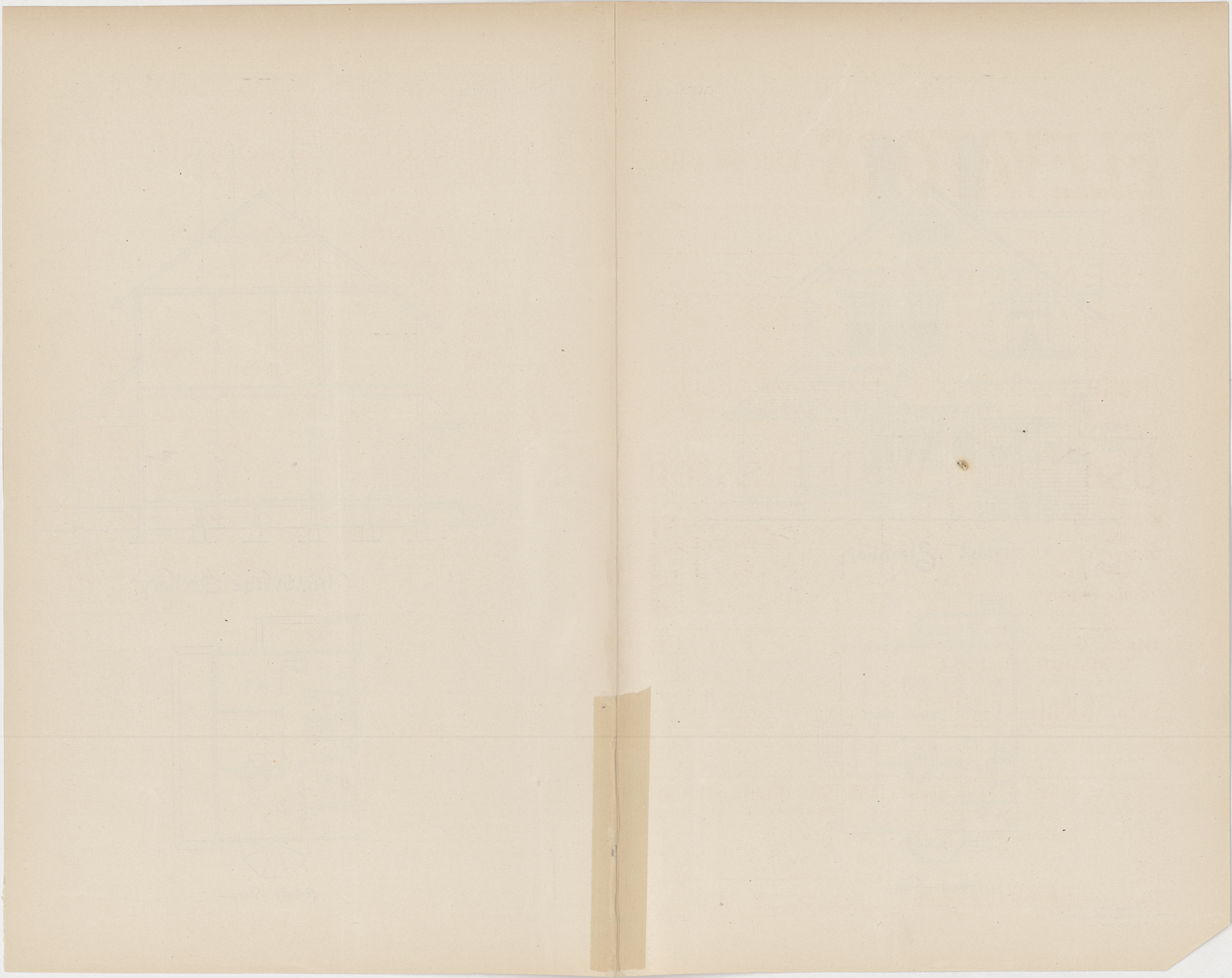
Ground Plan



Transverse Section



Chamber Plan



The Canadian Architect and Builder

VOL XIV—No 159

MARCH, 1901

ILLUSTRATIONS ON SHEETS.

Design for Moderate Cost House—R. M. Fripp, F.R.I.B.A., Architect.

ILLUSTRATIONS IN TEXT.

Porch, The Canada Company Building, King Street East, Toronto (The oldest Brick Building in Toronto.)
Canadian Architect and Builder Students' Competition for Vestibule Door—Design placed first—by Mr. Willford Gagnon, Montreal.

Design for Small Country House—W. Lee Clarke, Architect—(From The Builders' Journal.)
New Rooms of the Ontario Association of Architects and Toronto Engineers' Club.

ADDITIONAL ILLUSTRATIONS IN ARCHITECTS' EDITION.

Photogravure Plate—Interior of Fransiscan Church, Quebec—Berlinquet & Lemay, Architects.
Photogravure Plate—Detail of Part of East Front of Rushton Hall.
Accepted Design for Proposed New Toronto Hotel—Henry Ives Cobb, Architect.
Illustrations accompanying Paper by Mr. G. A. Reid, R.C.A., on "The Summer Cottage and Its Furnishings."

CONTENTS.

Supplies for South Africa	49	Bedding Stones	61
Financial Result of the Paris Exhibition	49	By the Way	62
The School of Practical Science	49	The Newest Thing in Wall Paper	62
A Dominion Exhibition	50	Slate Deposits in Newfoundland	63
Fire Escapes	50	A New Cement Test Wanted	63
Methods of Heating in Relation to Health and Economy	50	Toronto Builder's Exchange	63
The Commercial Position of Great Britain	51	New Building and Plumbing By-Laws for Montreal	64
Reducing the Fire Loss in Building	52-53-54	Notes	64
Students' Department—Toronto Architectural Eighteen		Montreal Correspondence	65-66
Club—A Twentieth Century Architect	55-56	Manufacturers and Materials—The Maritime Clay Works	
Remarks on Hardwood and Other Finishing	57	Company—The Composition of Some Canadian	
Intercommunication	58	Limestones	67-68
Building Contracts from a Builder's Point of View	59-60	A Correction	69

SPECIAL CONTRIBUTORS.

- PROF. S. H. CAPPER, Department of Architecture, McGill University, Montreal.
MR. W. A. LANGTON, Architect, Toronto.
" EDMUND BURKE, " "
" S. H. TOWNSEND, " "
" FREDERICK G. TODD, Landscape Architect, Montreal.
" R. A. L. GRAY, Electrical Engineer, Toronto.
" W. H. ELLIOTT, of Messrs. Elliott & Son Co., Toronto.
" J. C. B. HORWOOD, Architect, Toronto.

Supplies for South Africa.

THE quantity of food and other supplies required by the British Government for the South African campaign is enormous. Many classes of supplies, such as canned goods, hay, cheese and bacon, flour and salt, portable houses, wagons, bicycles, axes, etc., Canada could supply, but the bulk of the orders seem to go to the United States. As an example the war office is said to have just contracted with a United States firm for 3,000 axes. We have given British manufacturers a preference in our market, and should have a claim to British orders for products which can be as well supplied by Canada as by the United States. If the British Government are ignorant of our ability to supply many of its requirements blame attaches to the Dominion Government, and no time should be lost in putting before the home authorities the fullest possible information regarding the character and extent of our resources.

Financial Result of the Paris Exhibition.

THE footing up of accounts in connection with the Paris Exhibition indicates that if there be a deficit at all, it will be but a small one, while possibly there may prove to be a surplus—depending upon the willingness of the city to purchase certain improvements of a permanent character on the banks of the Seine. The cost of the buildings and other works was \$18,000,000; the expenses of administration \$1,700,000; policing, lighting, etc., \$2,500,000; "unforeseen expenses" nearly \$10,000,000; miscellaneous expenses, \$250,000, a total of \$23,-

450,000. The receipts from all sources, including subscriptions of \$4,000,000 each from the city of Paris and the Government of France amounted to \$23,050,000, leaving a deficit of \$400,000. This is a much better showing than was made by the French Exhibition of 1878, when the receipts fell short of the expenditure by six million dollars.

The School of Practical Science.

ATTENTION was called in these columns recently to the overcrowded condition of this school, and the urgent need for increased accommodation and equipment. During the present month this need has been forcibly pressed on the attention of the government by a petition presented by the students of the school. The prayer of this petition was strongly supported by deputations representing the Toronto Board of Trade, the Ontario Association of Architects, and the Canadian Manufacturers' Association. Emphasis was laid on the necessity of providing adequate educational facilities for the large number of young men who are desirous of qualifying themselves to fill the more lucrative positions in the rapidly developing industrial enterprises of this country, which positions are at present too frequently occupied by graduates of foreign scientific schools. As an illustration of the present overcrowded condition at the School of Science, the fact was mentioned that the present first year class in chemistry, numbering 120 students, had to be divided five times. The Premier admitted that means must be found to increase the ac-

commodation and efficiency of the school, and that at the present rate of expansion a new building would soon be the only remedy. The cost of a suitable building, together with the necessary additional equipment and teaching staff, was placed at about \$300,000. The government would seriously consider what action should be taken and from what source the necessary funds could be obtained.

A Dominion Exhibition.

THE Dominion Government is said to have appropriated large sums of money to cover the cost of Canadian exhibits at the Glasgow and Pan-American Exhibitions. A large sum was spent for this object at Paris last year. We are not disposed to question the wisdom of these expenditures. It is good business policy to advertise to the world the character and extent of our capabilities and productions, thereby inducing increase of our population and investment of capital. Why should not this be supplemented by the holding of a Dominion Exhibition in Canada and the effort to induce foreigners to come and actually see for themselves the kind of country we have and the greatness of its resources? We cannot hope to carry out an exhibition on the scale of those held at Chicago and Paris, nor should the attempt be made. Our natural development has reached a stage, however, which should warrant us in entering on an undertaking of this character on a properly proportioned scale. The Dominion Government last year refused to assist such a project, perhaps because of the large expenditure that was felt necessary to secure adequate representation at the great international Exhibitions at Paris, Glasgow and Buffalo. Next year when these shall have passed out of sight the subject of a Dominion Exhibition should receive practical consideration, and the Federal and Provincial Governments which for many years have been spending money on Exhibitions got up by and largely for the benefit of other countries, should make a liberal appropriation towards a Canadian Exhibition to be held in Canada, which the mother country, our sister colonies and our neighbors across the line should be invited to visit and send exhibits to. We have the nucleus of such an Exhibition at Toronto, and in connection with the proposal to erect new buildings the larger project should be kept in mind. It is doubtful if the property owners of the city whose approval must be obtained will sanction the proposed large expenditure for new buildings until just cause of complaint with the management of the Exhibition shall be remedied. If the project of holding a Dominion Exhibition in the near future is to be proceeded with it would be desirable to defer action with regard to new buildings in order that a comprehensive scheme adapted to the larger requirements might be formulated.

Fire Escapes.

The injury and narrow escape from death experienced by employees of factories in Toronto recently owing to the absence of means of escape from burning buildings, has been the means of directing public attention to this important subject. It appears that the Factory Act, which stipulates that factories must be fitted with fire escapes, delegates to the government factory inspectors the duty of enforcing observance of this provision. The matter is thus taken out of the control of the city council. It is quite evident that the government

inspectors have entirely failed in their duty in this regard. In consequence the lives of thousands of workmen and workwomen are daily in jeopardy. The subject has recently come up for discussion in the Legislature, and amendments are to be introduced which are designed to ensure efficiency, in the operation of the law. In a timely letter to the press Mr. A. J. H. Echardt has called attention to the necessity of providing the public school buildings with fire escapes. He instances schools of three and four stories without fire escapes and with only one stairway leading from the bottom to the top, which, in the event of fire starting in the basement, where the heating furnaces are placed, would act as a flue to carry the smoke and flames to the upper stories. The writer very correctly states that the ordinary iron fire ladders attached to the outside of the school buildings would be of little or no use, but that the proper thing would be to have the back part of the school built out, or a separate tower built, with a stairway as wide as the main one, reaching right to the ground, with doors leading to this stairway from each flat, so that in case of a fire in the front stairway the pupils could be got out by the back way, so making a double exit, which the children could use with swiftness and safety. The school authorities seem to rely at present entirely upon the fire drill, which is a useful means of preventing panic in the event of fire and also under some circumstances of securing the safe exit of the children from the building. It would however be useless as a means of saving the lives of children on the second and third floors, should exit by the single stairway be blocked by smoke and flame. No time should be lost in providing a more adequate safeguard.

Methods of Heating in Relation to Health and Economy

THE paper presented by Dr. Bryce, Medical Health Officer for Ontario, at the recent annual convention of the Ontario Association of Architects, and which was printed in full in our February issue, contains much valuable information which architects and manufacturers of heating systems, as well as the public, would do well to study and carefully consider. The author of the paper lays special stress on the necessity for greater attention to ventilation in connection with heating. Further than this, he shows very clearly the necessity for a proper degree of moisture to be maintained in the air of living rooms. It is not only that there should be a proper supply of fresh air introduced, but what is quite as important, that this air should contain a proper percentage of moisture. Dr. Bryce stated that where this percentage of moisture is not supplied, the air takes up moisture from every available source, including the bodies of the inmates of the building. He pointed out that in a school-room, for instance, where the air was not sufficiently moist, part of the necessary moisture was obtained from the mucous membrane of the children, thus leading to irritation of the membrane, and rendering the children very susceptible to disease. Here may possibly be found one source of the spread of diphtheria and other diseases of an infectious nature to which children are specially subject. Apart from this effect upon health, it appears that moisture in the air has also an important bearing upon economy in fuel. The author of the paper referred to stated that the inmates of a room, the air of which contained a sufficient amount of moisture, would be as comfortably warm with the temperature at 60 degrees,

as would the inmates of a room with dry air at a temperature of from 70 to 75 degrees. He estimated that to raise the temperature from 60 to 75 degrees would entail an additional expenditure for fuel of 25 per cent. These, and other statements, made a decided impression upon those who heard the paper read, and, in view of the importance of the subject, we have thought it advisable to call the special attention of our readers to it.

**The Commercial
Position of
Great Britain.**

FOLLOWING closely upon the announcement that Russia has increased its tariff on United States goods, comes a despatch from London that as an outcome of the inroads of American manufacturers upon British trade there is being formed the National Federation of Master Associations and Trades Unions to educate the minds of employees and employers in respect to the expansion of British trade, to devise means to meet foreign competition, to send joint deputations of capital and labor abroad to enquire into the conditions of other countries, and to provide a federation where employers and employees may meet on the same plane. This movement is under the leadership of Mr. John Lockie, late conservative member for Devonport, and is said to have the approval of the present British government.

The United States have not only become a strong competitor for the foreign trade of Great Britain and other European nations, but have also invaded the British market, and are securing a large share of the home trade. It is stated that in one industry alone (the manufacture of boots and shoes) Great Britain's trade last year was less by \$5,000,000 than in the preceding year, notwithstanding that the firms engaged in this industry are said to be among the most progressive and enterprising in the way of adopting improved machinery and other manufacturing facilities. The American manufacturer takes infinite pains to adapt his goods to the requirements of the particular market in which he seeks to sell, and by liberal advertising and persistent push keeps their merits before the notice of prospective buyers. In Great Britain there are many long established businesses which have descended from father to son. This has in many instances induced the idea that the system of management and character of goods that have been successful for so long a period may safely be continued. Rapid and startling changes are, however, taking place throughout the world, bringing changes in methods and requirements of the people. The nation that studies most carefully these changes, and constantly adapts its products to the new conditions, is the one which will obtain and maintain commercial supremacy. In this regard the United States seem to stand foremost to-day among the great commercial nations of the earth, hence the strides they are making in the development of their foreign trade.

It is gratifying to note that Great Britain is awakening to the situation and considering ways and means whereby she may hold her commercial position. History has shown that the British people when once aroused are prompt to act for the protection of their interests whether territorial or commercial. Prompt, intelligent and thorough enquiry into the subject of Britain's commercial facilities and relations with other nations would seem to be a present and important necessity,

and should be followed by equally prompt, intelligent and thorough reforms in methods, where such are found to be necessary.

The United States exports to Great Britain and Ireland are valued at \$600,000,000 per year, while the value of the imports from Great Britain into the United States is but 25 per cent. of that amount. The United States exports to Canada for the fiscal year ending June 30th, 1900, were valued at \$109,844,378, or more than the combined imports of France, Australasia, Austria-Hungary and Russia. While profiting so largely by British and Canadian trade, the United States continues to maintain a high tariff wall against these countries. The time seems to have arrived when freer access should be demanded by Great Britain and her colonies to the United States market, and in default of reciprocity of trade there should be a nearer approach than at present to reciprocity of tariffs.

Great Britain has in her colonies commercial allies which as yet she has scarcely taken any steps towards reaping the advantage of, but which, if brought into closer relations with her, would greatly assist in extending and maintaining her commercial supremacy. Canada has shown a desire to enter into such relationship by giving a substantial preference to British goods entering this market. That this action has not resulted in greater advantage to British manufacturers is largely due to the failure of the latter to make their goods better known in Canada, as well as to adapt the goods to our requirements.

Another phase of this question, as seen by an American writer, is presented in the following extract from the Engineering Magazine, of New York: "To the outside world the most impressive lesson of the Queen's death is the magnificent stability of British institutions and the British commercial system. Not a wheel stopped, save as a token of reverence; not a tremor in values disturbed financial centres; not an uneasiness or uncertainty as to national politics caused business undertakings to waver or hesitate. Compare this with the quadrennial upheaval in the United States, where economic legislation of every kind is the football of politics, and industry follows with uncertain feet now artificially raised on an unstable platform of protection, now sinking back from the morass of free silver, certain of nothing but uncertainty with every change of chief executive. The "demise of the Crown" demonstrates anew England's industrial strength, and those who are ready to cry her downfall before her industrial rivals would do well to remember that this stability of commercial organization outweighs much mechanical aptitude. Machinery can be bought, skilful brains and hands can be hired; but stable, political and commercial systems are of slow growth, and not soon attained."

A conference of Australian architects has been held for the purpose of forming a Federal Institute. In order to aid in the promotion of education it is intended to establish a travelling scholarship.

The Canadian Manufacturers' Association have requested the Mayor of Toronto to call a meeting of representatives of various organizations, such as the Board of Trade, the Trades and Labor Council, Ontario Association of Architects, the Guild of Civic Art, to prepare a plan for the beautifying of the city as a Victoria memorial.

REDUCING THE FIRE LOSS IN BUILDING.

BY EDMUND BURKE.

To put the matter in a nut-shell, the best means of reducing the fire loss would be the conversion of the

There is no doubt but that the total volume of insurance would be reduced were such methods adopted, while on the other hand the fire losses would be much less, and the net profit of the underwriters greater.

The same unity with regard to risks, as that now exercised in the imposition of rates, should result in immediate and great improvement in methods of construction.

It may be asserted that it devolves upon the architect to introduce better methods. The true architect, who has the safety and welfare of the community at heart, is only too glad to adopt the very best methods, but in ninety nine cases out of the hundred his hands



ROOMS OF THE ONTARIO ASSOCIATION OF ARCHITECTS AND TORONTO ENGINEERS' CLUB,
96 KING STREET WEST, TORONTO.

insurance companies to more scientific examination and classification of risks.

It is useless to argue that strict civic by-laws should be enacted. The Ontario Association of Architects through the local organization in Toronto, made a serious effort in this direction three or four years since, when endeavoring to have the city by-laws revised and improved. They were immediately confronted with objections by real estate owners, aldermen and builders. These affirmed that the increased cost which would be involved by the adoption of proper and scientific methods of fire resisting construction would put an effectual damper on building operations. The good intentions of the architects, as a consequence, came

are tied by his employer; he is told that it is folly to add twenty, thirty or forty per cent to the cost of a building when there is but little difference or advantage in rates of insurance. The desire of the building owner is to obtain the greatest return for least outlay, and he will



ROOMS OF THE ONTARIO ASSOCIATION OF ARCHITECTS AND TORONTO ENGINEERS' CLUB,
96 KING STREET WEST, TORONTO.

to naught. It maybe taken for granted that the only way to effectually reduce fire risk is to appeal to the pocket of the building owner by means of decidedly low rates of insurance on classes of buildings which absolutely conform to the best known methods of fire resisting construction.

naturally object to enter into any increased expenditure which will not bring corresponding returns. The lightly built cheap building of the usual fire trap construction, generally returns, for a time, the best net income, and he therefore prefers and insists upon the erection of that class of building.

It should be borne in mind that every fire resisting building is a boon to the community. It is an efficient fire stop, and reduces the fire risks for a considerable radius in the neighborhood. Every additional building

attacked it in a weak spot. If the windows in the light well overlooking an inflammable building close by had been properly protected no serious damage would have occurred. The standard wooden shutter covered with

tin is the most reliable protection.

Woven wire glass set in metallic sashes, which are hung with chains in metal frames are superseding the wooden tin covered shutter in many instances.

The advantages are that the light is never shut out, they are not so liable to be left unclosed, or carelessly left open, as is the case with the shutters, and if a fire starts behind them it is not concealed till it has obtained great headway.

Where greater safety is desired

of the kind is a further safeguard, and were such buildings sandwiched freely among those of even the most flimsy construction, no very extensive and wide spreading conflagration could occur.

The greatest encouragement, therefore, should be given to those who are willing to erect buildings of the best class of fire resisting construction.

Fire hazards may be divided into two classes, external and internal. With regard to external hazards, the fire loss in buildings would be very appreciably reduced were more attention paid to the protection of the window openings. The complete destruction of the inflammable interior fittings and stock of a large fireproofed departmental store in

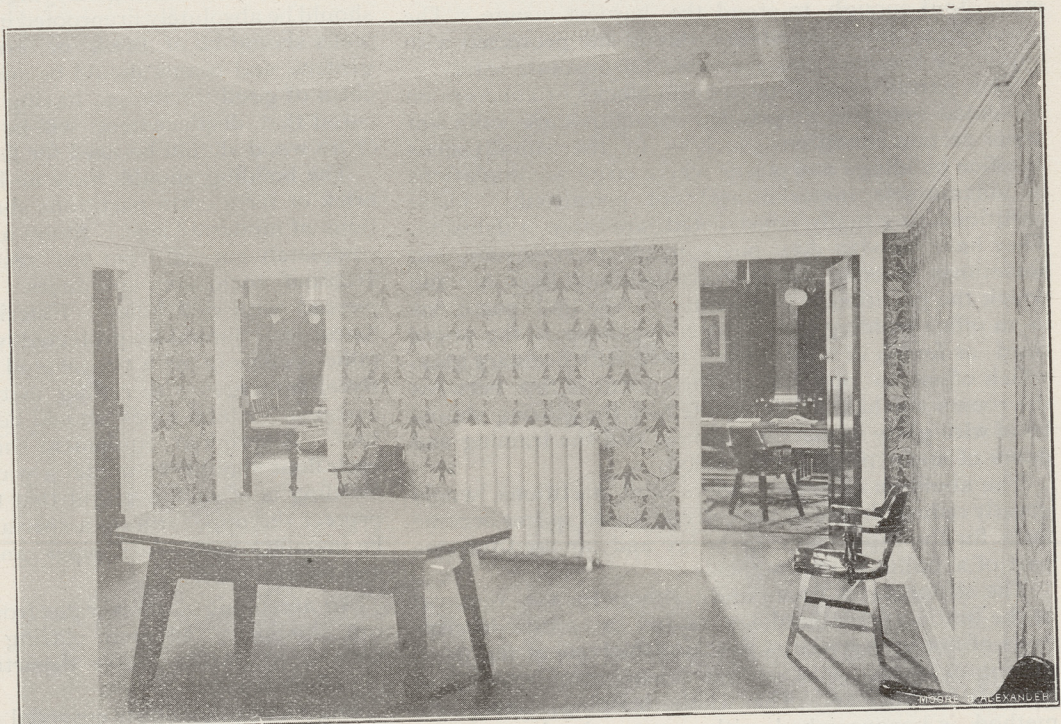
Pittsburgh was chargeable to a fire in an adjoining building and unprotected window openings, as was also the burning out of a portion of the interior of the Home Life Insurance Co. in New York City. The latter building was considered one of the best of New York's fireproof buildings, but an external fire

the glass may be doubled, giving almost as good protection as the shutters; the tin covered shutters, however, are required for certain of the most severe risks.

Wire glass is, of course, practically out of the question on street frontages.



ROOMS OF THE ONTARIO ASSOCIATION OF ARCHITECTS AND TORONTO ENGINEER'S CLUB,
96 KING STREET WEST, TORONTO.



ROOMS OF THE ONTARIO ASSOCIATION OF ARCHITECTS AND TORONTO ENGINEER'S CLUB,
96 KING STREET WEST, TORONTO.

Rolling metallic shutters are occasionally used, but the cost, and the time and trouble required to open and close makes their general use impracticable.

The water curtain is another device for the protection of external openings. It has been used in very few buildings, and it is a matter of surprise that owners

and underwriters are content to expose enormous stocks to the frail protection of sheet glass, or plate glass of large area which may be shattered on every storey in an instant, allowing the heated gases, if not the flames, of an adjacent fire to cause instantaneous ignition on several floors simultaneously.

The severity of our climate in winter presents a difficulty in the application of the water curtain. It is necessary to use what is called the dry system, the piping being kept free of water till it is required.

Among the other external appliances for reducing fire risks may be mentioned stand-pipes, which are carried up to the roofs of tall buildings, with attachments near the sidewalk for connection from steam fire engines or city pressure.

The provision for fighting an external fire from the roofs of the Eaton establishment undoubtedly saved those premises during the progress of the Simpson fire in Toronto in 1895. The internal hazards cover a large range.

Probably the greatest fire loss is occasioned through large undivided areas, not only horizontal but vertical. Until strict and undeviating rules are enforced reducing the area of all compartments containing inflammable material or goods, the fire loss will be abnormal. The structure itself may be built of the most approved fire resisting materials, but this will not save the contents. In fact there is danger that the burning of the contents, if great enough in volume, will wreck the building or so seriously damage it that extensive repairs or reconstruction will be involved.

It is equally necessary for the reduction of the fire loss that staircases and elevators should be entirely enclosed and cut off from the building by fireproof walls and automatic fireproof doors.

The height of buildings has a direct relation to the proportion of fire loss. It is practically impossible to control a serious fire with present appliances in a building of more than four storeys, or say 45 to 50 feet in height. Buildings of greater height should be built of fire resisting materials, divided into compartments of restricted area, and equipped with automatic sprinklers.

The partitions forming these compartments, to be thoroughly effective, should be constructed of brick walls stout enough to stand the hardest usage. The openings in these partitions should be protected with automatic fireproof doors, double for absolute safety.

Thin partitions of 4" terra cotta blocks or concrete on expanded metal in fireproofed structures are sufficient under certain conditions, such as for the sub-divisions in office buildings and places where large accumulations of inflammable material are not permitted. These partitions, as usually constructed, are often a delusion. They have wooden door posts, heads and transoms and sometimes wooden sill pieces which may burn out and wreck the partition. Frequently all the hall partitions in an office building have large openings in the upper third or fourth of their height, filled with ordinary glass which offers no obstacle to the spread of fire between the rooms and halls. To be effective the glazing should be of wire glass in metallic frames, and the framing and doors of metal or protected wood.

The abolition of hollow floors and partitions would greatly reduce the fire loss, as all concealed spaces become flues for the rapid carrying of fire and smoke from one part of a building to another.

The strapping of floors and ceilings for the removal of the foul air from buildings heated by certain descriptions of hot air apparatus has furnished one of the most glaring examples of hazardous construction which it is possible to conceive. The whole building, under this method, is honeycombed with a network of concealed and continuous spaces, and but a spark is needed to reverse the current and carry the fire, almost instantaneously, to every section of the structure. Happily this system of ventilation is becoming obsolete, and none to soon as far as safety from destruction by fire is concerned.

The abolition of hollow construction and the adoption of solid floors and partitions is entirely feasible in all but exceptional cases, and even in these certain pre-

cautions in the way of fire stops could be introduced.

All external wood bracketting, cornices and other exposed woodwork, especially at considerable height, should be abolished; as good an effect can be obtained with metallic mouldings secured to wrought iron bracketting or frame work.

In the so-called fireproof buildings too little attention is paid to the protection of the girders and columns. The floors are usually of a most solid description, but the parts referred to, which receive the first and greatest impact of heat have frequently but a thin veneer of fire resisting material which breaks or scales off permitting the heated gases to warp and twist the structural members, to the destruction or distortion of the building.

The fire loss could be reduced by constructing each floor as a watertight unit. The damage to the contents of lower floors by water only must constitute a large proportion of the fire loss.

It must not be forgotten that the inflammable wood trim and the contents of the best fireproof building ever constructed will burn if ignited. Few fires would spread if the first pail of water could be applied at the opportune moment.

One of the very best means of reducing the fire loss is the automatic and early application of water. This is accomplished by the installation of automatic sprinklers. Every foot of the premises to be protected should be covered making the spread of fire almost impossible under any but the most extraordinary circumstances.

Another important method of reducing the fire loss would be closer inspection of alterations. Frequently an otherwise safe risk is made a very bad one through structural changes in after years, sometimes made by or for tenants or others unacquainted with or careless of the original scheme adopted to make the hazard a safe one.

To sum up, "the best means of reducing the fire loss" lies largely with the fire underwriters who should encourage the best class of fire resisting buildings by adopting specially low rates for such, with penalties or increases for every infraction of well defined rules in connection with standard methods of construction and equipment.

The standard building carrying the most favorable rates should be absolutely fireproofed in every particular. The walls should be of brick or terra cotta, the columns; girders, and beams should be amply protected with terra cotta of good thickness, having air spaces, and so secured that displacement will be impossible. Little or no wood should be used for floors and trim.

The building should have no large unbroken areas; brick or terra cotta partitions should divide it into sections of moderate size. Stairs and elevators should be completely cut off from the rest of the building with fireproof enclosures and doors. Floors should not be pierced with well holes. Exterior openings on areas, lanes, etc., should be protected with wire glass in metallic sashes or with tin-covered shutters, and those on street frontages with rolling metallic shutters or water curtains. Stand-pipes should be run from sidewalk to roof. A sprinkler equipment should be installed, and each floor should be made a water-tight unit. If the building is of such a height that the city service will not protect the upper storeys a special pumping plant should be installed with stand pipes and hose on every floor and on the roof.

An ascending scale of rates from a very low minimum rate should be adopted, placing adequate penalties or fines in proportion to the departure from the standard of safe building.

High buildings not fireproofed or protected by sprinklers and shutters should be discriminated against by extra high rates.

Buildings having beams and joists of wood should have open construction, avoiding closed spaces. The joists should be heavy and set a good distance apart, carrying heavy plank floors. All spaces caused by furring out or strapping should have frequent cut-offs or fire stops. The areas should be divided as in fire resisting buildings, but with even greater care and of less size. Elevators and stairs should also be similarly cut off.

STUDENTS' DEPARTMENT.

TORONTO ARCHITECTURAL EIGHTEEN CLUB.

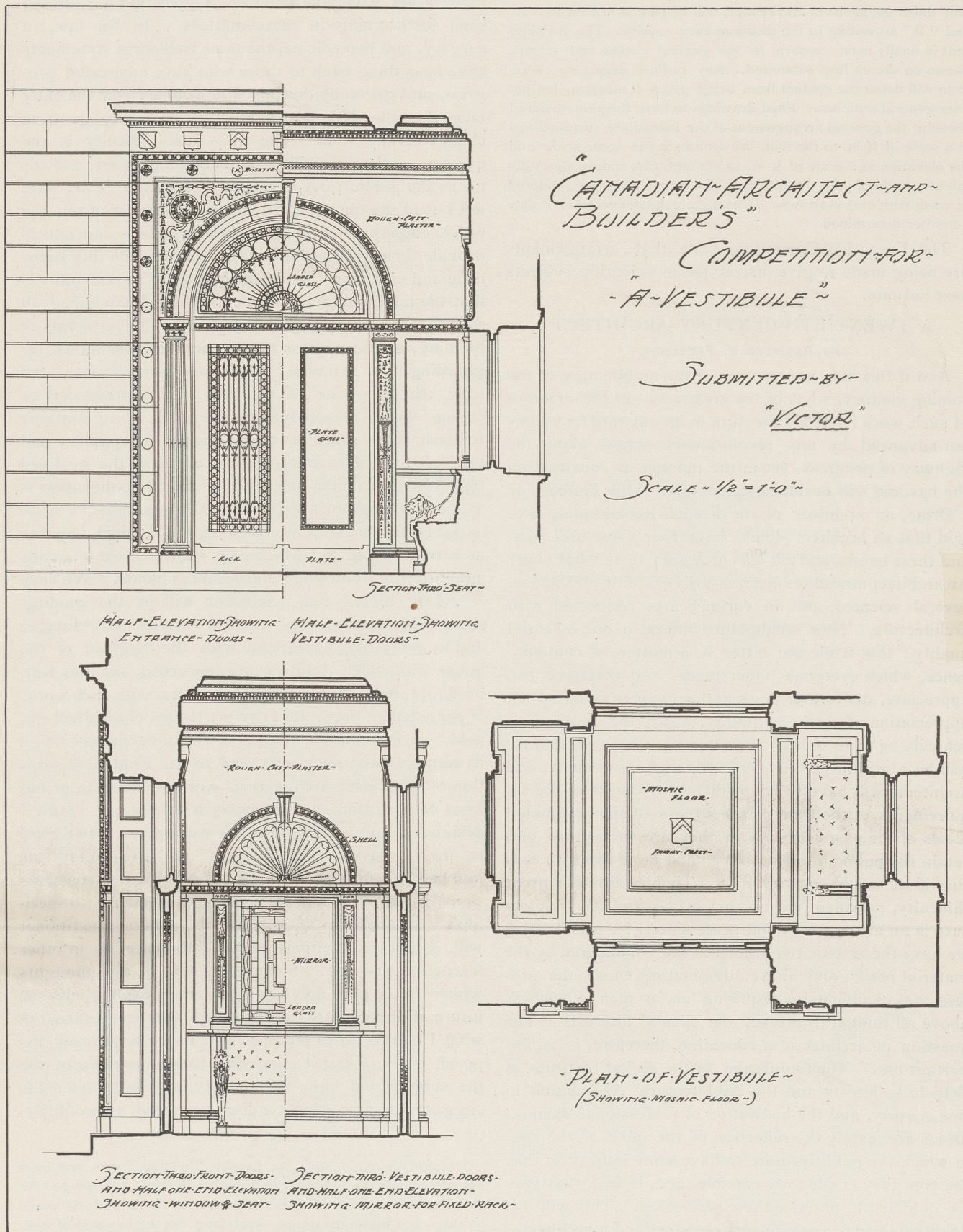
The Club have affiliated with the Central Ontario School of Art and Design, of which they will form the architectural section. Rooms have been secured in which to carry on the educational work in behalf of students. This work is under the direction of an Executive Committee of three. The Committee have appointed six patrons who will act as instructors to the classes, of which three have been formed—one primary and two advanced.

Three meetings have already been held with an average attendance of about fifteen students. The rooms are at the disposal of students for study at all times. Criticisms of the students's work will be given by the instructors on Tuesdays and Thursdays.

The following is a programme of the first problem in design :

"A Casino on a wealthy gentleman's wooded estate. The building is to be constructed of stone or marble.

"The casino is to be used chiefly in summer time and will be a building of a monumental character. Concerts, dances, etc., will be held there, and accommodation must be provided for the proper carrying out of such functions, the general character of



CANADIAN ARCHITECT AND BUILDER STUDENT'S COMPETITION FOR A VESTIBULE—DESIGN BY "VICTOR"
 (MR. WILLFORD A. GAGNON, MONTREAL), AWARDED FIRST PLACE.

such a summer casino should be well considered in the plan.

"A stream runs through the estate, and a building may be placed so as to take advantage of this in the general scheme of surroundings or not, as the designers see fit. The levels of the grounds are left to the imagination. It is specially desired that this building should have a classic treatment.

"Each student will make a study of his general scheme in plan and elevation of a scale to 1/16 in. to the foot and send a freehand tracing of the same, dated and signed, to the Chairman of the Educational Committee, on or before noon Wednesday, March 6th, 1901.

"As this programme is issued for the purpose of classifying the students, the preliminary sketch will determine who shall proceed with the development of the problem. Those who are not found eligible will be placed in Class "C" or Preparation Class. Those who finish the problem and render, will be placed in Classes "A" and "B" according to the mentions they receive. The drawings sent in finally must conform to the general outline and scheme shown on sketch first submitted. Any radical departure therefrom will debar the student from being given a mention, but not from general criticism. Final drawings to have the plan rendered showing the general arrangement of the immediate surroundings at a scale of 1/8 in. to the foot, the section at the same scale and the elevation at a scale of 1/4 in. to the foot, also a drawing of detail at a scale of 3 in. to the foot. The drawings to be rendered in wash with cast shadows. Drawings to be delivered on a date hereafter determined."

The Executive Committee state that arrangements are being made to give instruction in scientific subjects next autumn.

A TWENTIETH-CENTURY ARCHITECT.

BY BANISTER F. FLETCHER.

And if this is a correct view of the architecture of the coming century, what of the architects—of the creators of such work? If architecture in its outward forms has not advanced by any revolutionary stages along the highway of progress, yet in the manner of construction she has and will develop exceedingly. Old Philbert de L'Orme, an architect of the French Renaissance, once said that an architect should have four eyes, four ears, and three hands, and if it was necessary then, what now? An architect nowadays is necessarily skilled in mechanics, several sciences, and in various arts connected with architecture. Now architecture differs in one essential quality: that while the latter is a matter of common-sense, which everyone understands, and therefore can appreciate, the former in its highest stages is based on appreciation of æsthetic quality, which the public can scarcely be expected to understand. The new century will be a utilitarian and scientific age essentially, and architects will have to adapt themselves more to the requirements of the time, and hold less to the antiquated ideals of the past centuries, if they are to capture and retain the public interest. We must be of the 20th century if we would succeed in it. Therein lies our great difficulty, prevalent in no other profession, for architecture is an art, science, and profession. In architecture we have the artistic requirements sadly hampered by the material needs, and above, dominating those, the professional qualifications requiring us, as men of business above all things, to protect our clients' interests. The question of architectural education, therefore, is an important one. The foundation of the Royal Institute of British Architects and the Architectural Association in this century, and the institution of professional examinations are merely the reflection of the spirit of the age, in which the public require to have some indication that the men they employ are capable, and, in fact, that they are qualified to practice their profession. This will undoubtedly lead to a compulsory registration for architects,

when no one will be allowed to practice without a diploma.

To the public it is a never-ending theme of amazement that anybody can call himself an architect. And truly it is quaint. We cause the men we direct on our buildings to be registered. We have our registered plumbers, our carpenters, bricklayers, joiners, plasterers, and masons, who have all served their apprenticeship, besides being technically educated, and yet anybody can call himself and practice as an architect. Let us think for a moment of the power for good or evil in an architect's hands, due to his knowledge or ignorance in matters connected with building, and then who can doubt but that this compulsory registration is bound to come? Opposition has always been forthcoming in these matters. In the law, in surgery, and in medicine, the same well-worn statements have been flung back to those who have advocated progress, and generally this opposition comes from the older men, the relics of a past age, who can see no good in change of any kind. The only real difficulty is the question of the possibility of examining in art, and, as far as the public goes, it would not matter if art were left out of the question, for in nine cases out of ten the public employ us to protect their interests, and not to provide them with artistic work, about which they know little and care less. The principal thing to remember is that the public expect us to be thoroughly qualified all round, to be directors and experts of all departments of building, and to possess the business qualifications for guarding their interests, which are usually associated with the profession of the law. If a profession or calling which is employed by the public is to continue to exist there must be confidence by the public; and how are the public to know with certainty the qualified from the unqualified, unless some official qualification is available? Again, a great part of the architect's ordinary practice consists in utilitarian work, which requires no artistic talent, but which does require great scientific and practical knowledge and business habits. We have elsewhere hinted that sanitation will be the guiding star of the next century, and in matters of drainage, and in everything connected with the hygiene of the house with which architects are concerned, and they will, no doubt, be properly registered to deal with such work. If persisted in, the present fine-art theory of architecture, held by a few eminent architects who have clients enough to support their fancy, will tend to the gradual absorption of legitimate architectural work by builders or big firms of decorators, who probably will employ a "tame" designer to put a frontal to their stock plans. In regard to the increasing complexity of our civilization, the number, extent, and intricacy of new types of constructions, it may also be expected that the tendency to specialize will develop itself, although the general practitioner will, of course, continue to hold his place, as in other learned professions. Such are a few of the thoughts which I have been able to put together, dealing with the future of architecture, and although they are far short of what I had hoped to produce, yet, in the time at my disposal, I have found it impossible to go more deeply into the subject, but hope that I may, at least, have made suggestions upon which a discussion may be profitable.

Draughtsmanship, says the London Building News, has been put before design or thought to a degree that has discouraged the practical and artistic minds in the profession: and we do not mean by this word skilful drawing or sketching, but the business of making and coloring perspective and other drawings of buildings by men who know little or nothing of construction.

* From a paper read before the Birmingham Architectural Association, on Architecture of the Twentieth Century.

REMARKS ON HARDWOOD AND OTHER FINISHING.

The practice, which is now fairly established in Canada, of finishing two or more rooms in good houses, with hardwood, is a commendable one, and deserves to be extended to all rooms in the main stories of good dwellings. There is no lack of good and suitable hardwoods in the Dominion, and in some instances, these woods may be obtained at a less cost than clear white pine, and the cost of working and finishing them, is perhaps 25 or 30 per cent. more than for the same character of work in pine, while the results are a hundred times happier.

Black birch, (*Betula Nigra*), which is a native of this country, is especially adapted for inside finish, and when properly wrought, has a fine quiet refined appearance, and for the last fifteen years has been quite popular. It is close-grained, and can be stained with a filler to resemble walnut exactly. It is just as easy to work, and is suited for any of the purposes to which the more costly wood is applied.

To give birch the appearance of cherry or mahogany, it should be rubbed with diluted nitric acid, after it has been planed and finished up with either scraper or No. 0 sandpaper. Afterwards, to a filtered mixture of one ounce and a half of dragon's blood dissolved in a pint of spirits of wine or alcohol add about half an ounce of carbonate of soda, the whole constituting a very thin liquid which must be applied to the work with a soft brush. This process must be repeated with very little alteration, and at short intervals of time, until the work assumes the tint required. If the work has been well done and the composition properly made, the surface will assume quite a brilliancy. To complete the work, raw linseed oil should be rubbed over the surface and wiped dry, as no portion of the oil should show on the work.

This same process will answer for finishing cherry—which is now getting to be a very scarce wood—which shows more veining in the finish than birch.

Cherry may be darkened by coloring the spirits of turpentine used in thinning down the filler, but, when no filler is used, it may be washed down with lime water, which will give it a desirable color. It is best always to try a piece of the wood before washing down the work to insure the proper tint.

Where it is desired to stain white pine, cedar, poplar or basswood, to give an appearance of cherry or black birch, any one of the following compounds may be used:

For a water stain, boil in a gallon of water one pound of Spanish anneto and one ounce of concentrated lye (potash); should this not be deep enough, allow the water to evaporate by a gentle heat. The stain can also be made darker by adding gamboge previously dissolved in a weak solution of potash.

For a good oil stain for pine make the following:—Mix gamboge in linseed oil, dilute with turpentine, add a little japan as a siccative, apply with a fine hair brush, not too thickly. This produces exactly the same tint as the water stain, but will not fade as the other may in some conditions. The tint may be deepened by adding a little dragon's blood or burned sienna finely ground in linseed oil.

Another durable stain may be made by stirring and well mixing together one quart of spirits of turpentine, one pint of varnish, and one pound of dry finely ground sienna; apply with a brush and after it has been on about five minutes wipe it clean off with rags. This stain re-

quires about twelve hours to dry, after which it may be varnished and rubbed.

A better stain than either of the ones given may be made by taking one quart of alcohol, two ounces of dragon's blood; pulverize the latter along with about a quarter of an ounce of alkanet root; mix and let stand in a warm place for several days, shaking it up from time to time. Apply with a sponge or a fine brush, giving a thin coat at first. Two or three coats may be required to give the proper tint.

This stain penetrates the wood for some depth, and when properly varnished and rubbed down, makes the soft wood look exactly like cherry or birch as the case may be.

When "rubbing" is not desired, a coat of good shellac varnish will make a very fine soft finish and show up the grain of the wood to perfection.

There are over forty kinds of oak, natives of the American continent, about ten of which grow in Canada, and of these the white oak, (*Quercus Alba*), the red oak, (*Quercus Rubra*), and the black oak, (*Quercus C. Tinctoria*), are the most employed in interior finishings and furniture, and are all capable of being handsomely finished, the black and white oaks being the best, and the red being next.

What is known as quarter-oak is made by first sawing the log from end to end through the middle. Then each half is sawed from end to end through the middle, thus leaving four quarters. Each quarter has only three sides, one side the bulge part of the log, and the other two sides flat and coming to an edge. The boards are sawed off the sharp edge, and each sawing, therefore, throws off a board wider than the one before it. Sawing the quarters of the log in this manner, lumber possesses that beautiful cross-grained figure that is so much admired in oak.

To make a good imitation of antique oak, lamp black or vandyke brown should be mixed with the wood filler, and the latter should be made about the consistency of thin cream and applied with a brush. After standing an hour or so, the superfluous filler should be removed with excelsior and cleaned off with rags. When hard and dry, the work may be varnished or otherwise finished.

Another method of imitating antique oak, is to expose the wood to the fumes of ammonia, but as this is only possible with small works, the application of aqua ammonia with a brush is resorted to with a fairly good effect. Several applications must be made to get the required shade.

A quicker, and perhaps better method, is to use strong vinegar with iron filings or shavings added; by a little experimenting, this can be made to suffice with one coat, depending upon the amount of iron added to the mixture.

The ammonia and vinegar processes answer effectively only on white and black oak. Red oak must be treated with stains mixed with the fillers, when excellent results follow.

Colouring gives repose to the eye when shadings and shadows are, as in nature, used in true contrasts to the lights, and produces the rule for harmony. Examples of neglect of such harmony may frequently be seen in our modern domestic dwellings. For example, it will be found that rooms with north lights are often decorated with ornaments shaded in greys or cold colours, whereas warm shadings should be used, and vice versa, rooms with sunny aspects as a rule should be treated with cool shadings. The choice depends, however, considerably upon the source of light in the room, whether from direct or reflected rays. The artist will at once see and adapt his colour-decoration to the peculiarity of the situation.

INTERCOMMUNICATION.

[Communications sent to this department must be addressed to the editor with the name and address of the sender attached not necessarily for publication. The editor does not hold himself responsible for the expressions or opinions of correspondents, but will, nevertheless, endeavor to secure correct replies to queries sent in. We do not guarantee answers to all queries, neither do we undertake to answer questions in the issue following their appearance.]

In answer to B. J. F., North Bay, I submit the enclosed sketch of a trussed bridge, Fig. 1., that I think

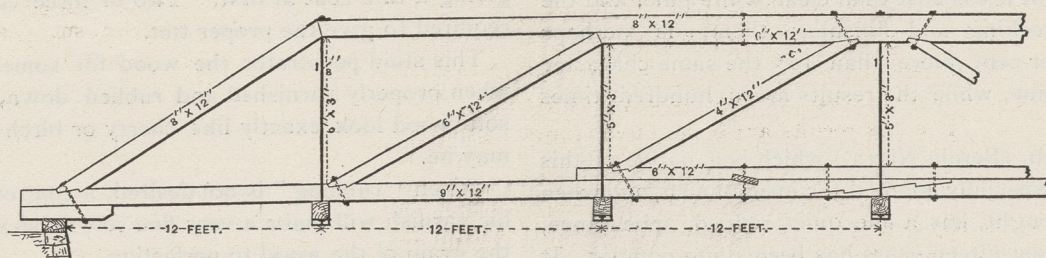


FIG. 1.—BRIDGE TRUSS, SIDE ELEVATION. SCALE $\frac{1}{8}$ INCH TO FOOT.

will meet his requirements. The sketch shows the construction without further explanation than to say that the rods and iron plates should be provided with good cast iron washers of such shape that all the nuts will fit square with the bolts. The washers at the angles of the main braces and upper curves are made to take both rods and to extend over the joint sufficiently to hold the brace. The drawing is scaled for a span of 72 feet, but it would stand good for 75 feet. While this is intended, as B. J. F. wants for a 14 feet roadway, it would do for a roadway 16 feet wide, and this is what it ought to be made, as 14 feet is too narrow for meeting teams. The bridge should have at least 6 inches spring in the centre, in order to give it a slight arch form. Fig. 2 shows the manner of bracing it crossways, also the method of running in the joists or deck timbers. Fig. 3 shows a cross-section of truss, and the manner in which the bolts are placed. I hope this will be of service to B. J. F.—OLD CONTRACTOR.

W. R. D. asks: Can you inform me the degree of heat necessary to transform limestone from its natural state into lime, and what time is required to complete the process in an ordinary lime kiln? Does it require gradual heat, or a quick fire?

ANS.—From 36 to 48 hours may be needed to burn a kiln of lime, and a white heat must be attained in the burning. The carbon of the fuel acts to facilitate the

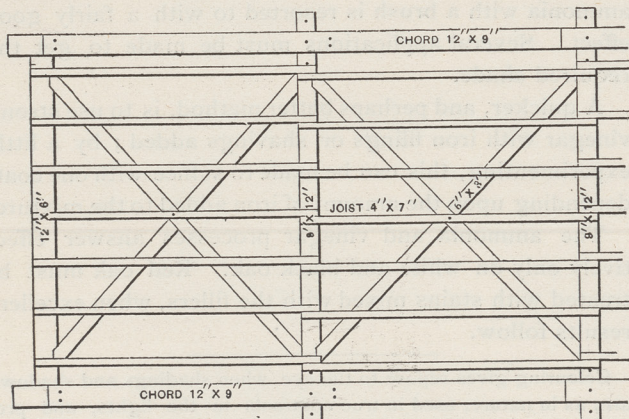


FIG. 2.—FRAMING OF DECK TIMBER. $\frac{1}{8}$ INCH TO FOOT.

operation by its reducing action; gradual heating is not necessary.

R. Dow would like to know what will remove or prevent mildew or frosting on brickwork? I put up a brick building a year or so ago, and certain portions of the wall will persist in getting white. I have rubbed off the white

several times but it appears again in a day or two, and disfigures the building very much.

ANS.—Builder's acid (muriatic acid) is often used for removing white stains from brickwork, and you might try it; dilute with water. A coat of raw linseed oil on the dry bricks will have a good effect, besides benefitting the brickwork materially. Melted paraffine applied hot and worked in with a paint burner would also be efficacious.

ous. In time the white efflorescence will cease to appear. It is caused by some chemical compound in the clay from which the bricks are made, and in a dozen years or so exhausts itself.

J. Mc. D. asks for a method by which he can get the proper curve for a hip-rafter of a verandah having a flat ogee roof? We hope some one of our readers will

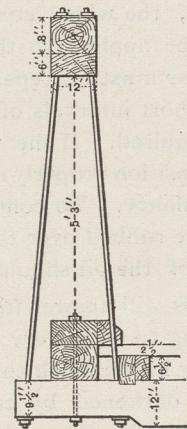


FIG. 3.—SECTION OF TRUSS.

answer J. McD's. query, and send a diagram for publication, of the method he asks for.—(ED.)

WM. T. C. writes:—I am putting a steam heater in my building to heat it, and I wish to wrap the steam pipes with common building paper. Can I saturate or cover the paper with a cheap solution that will prevent the paper from taking fire with the steam at ten pounds pressure?

ANS.—There is no danger from wrapping the steam pipes with paper in a low pressure heating apparatus. Old carpet cut in strips or listing, makes a very good felting for the inside next to the pipe. The paper should be put on loosely and tied with twine. The paper may be made fire-proof by dipping it in a strong solution of borax and sal ammoniac or alum. Asbestos paper will be found the best. It may be obtained now for about 15 cents per pound.

PETER MC. L.—In framing a balloon house which stands on a stone foundation, which is the better way to frame the sill, there being no heavy timbers used in the building? I know the practice differs; in some plans a joist is laid flat on the stone work, while in others two joists are laid on the foundation, on their edge side by side. There are also other methods, but which is best?

BUILDING CONTRACTS FROM A BUILDER'S POINT OF VIEW.*

In the olden days it was, as you know, the custom for the architect personally to superintend the erection of his own work, and so now, if perfect work is to be produced, it is essential that the architect and builder should be in sympathy one with other, so that the true spirit of the design may be carried out. To ensure absolute perfection in workmanship, only approximate prices should be given, and the work executed upon a percentage upon cost basis, or at daywork prices. Either of these courses from a builder's standpoint may be considered ideal, and as such would not commend itself to the ordinary commercial proprietor, who, on the average, has far more consideration for his pocket than for architectural effect. There can, however, I think be no doubt that in the majority of cases bad workmanship is the result of low prices and strained relations between architect and builder, and when this fact is fully realised, and architects make up their minds to minimise competition to fair and reasonable proportions, and also make the condition under which the builder has to work as easy and comfortable as possible, then, I think, they will find very little cause to complain either as to the quality of the workmanship or the manner in which it is executed.

To a builder the two most important factors in connection with building contracts are the conditions or form of contract, and the bill of quantities. If the former is fair and reasonable and the latter correct and explicit, he may (should he know his business), with ordinary luck, rely upon getting through his work without losing any money, and if the conditions under which the contract is taken happen to be favourable and the competition not too keen, he may make a profit. Losses on contracts outside those occasioned by sheer misfortune, can, in nearly all instances, be traced to certain causes, and in the majority of cases these are (1) misconception of the conditions of contract whereby you contract to carry out considerably more than you bargained for; or (2) inexplicitness on the part of the quantity surveyor. Speaking in this connexion, cases have come to my own knowledge where surveyors have been instructed in certain instances to make their quantities as inexplicit as possible, with a view to deceiving the competitors, and so keeping down the amount of the tender. I am pleased, however, to say, in the instances referred to, that the surveyors did not follow their instructions. With regard to the form of contract, for my own part I much prefer a sheet of notepaper saying that I am prepared to do certain work for a certain sum, to an architect's satisfaction, and specifying the terms of payment. It is obvious however, that in a large number of cases, and with most people this course would be unwise, and that a properly drawn form of contract is preferable, setting forth in precise terms what is agreed upon. Originally these contracts were drawn on behalf of the building owner by his solicitor, paid, I presume, so much per folio; the innocent builder of the days of our youth, confiding as a child, would not employ a solicitor to look after his interests, and being anxious to get the work would sign anything he was asked. As a consequence we have handed down to us forms of contract, which, I think I am safe in saying, many of us have signed without reading, and even if read, not understood, and which, if we had

been legally held to them, would have resulted in our seeking fresh woods and pastures new. In recent years, however, this is changed, and although we are continually being asked to sign many different forms of contract, there is rarely much trouble in getting architects to see that there are two sides to every question, and that the builder is every bit as much in need of protection as the building owner. It is extremely rare for any contract now to be put before a builder which does not contain an arbitration clause, and yet fifteen or twenty years ago any man that asked for such a thing was regarded as a dangerous individual. It is strange that builders should have for such a long time existed without such a clause, and this may well be regarded as an example of their easy and tractable nature. All other contracts between business men invariably contain it, and, to my mind, in the building trade, with its many complications, it is all the more necessary, and as much from the employer's point of view as the builder's. The general impression seems to have been that unless the builder was entirely in the power of the architect, disputes would constantly be arising. Time, however, has proved differently, and as the insertion of the clause protects builders from unprincipled architects or so-called architects, it has also the effect of causing the exercise of more care on the part of the employers and architects in the conduct of their works.

Many architects adopt forms of their own. These, experience has taught me to be careful of, and always, if possible, avoid signing. With two such forms as those already referred to there is no necessity to go any further.

Speaking of forms of contract generally, the principal points the builder has to consider are (1) time clause; (2) terms of payment; (3) inability of proprietor to pay; (4) liability for acts of other persons or things; (5) maintenance clause; (6) arbitration clause.

As to the time clause. In the majority of cases this is more honored in the breach than the observance, and for the reason that the time is named without thought, and in most instances is altogether inadequate. Considerable dissatisfaction is caused to the proprietor who cannot understand reasons for delay, and is therefore more anxious to get from the contractor damages to which he is not entitled. It is most decidedly to a contractor's interest to get his work done as quickly as possible; and for the benefit of all concerned a reasonable time should be appointed in which the work can fairly be executed, and to this both the contractor and architect should be held, delays in many instances arising as much from dilatoriness on the part of the architect as on the part of the contractor.

In reference to the terms of payment. From time immemorial it has been usual to pay eighty per cent. on the value of the work executed and fixed in its place. Since this arrangement was instituted the times have considerably altered, and it is impossible for a builder now to obtain the same terms from merchants and manufacturers that he got eight or ten years ago. Then it was usual to be allowed on most goods four or six months' credit, and on timber six months, whilst in several cases twelve months' accounts were allowed. Now all timber, iron, stone, bricks, and, in fact, by far the largest portion of the materials used in a building, have to be paid for in a month following delivery, whilst in a few favored cases a three months' account is allowed. This you see, means practically a cash business, so that

* Abstract of a paper read by Mr. Frank Cowlin before the Bristol Society of Architects.

it is impossible to carry on anything like a large establishment on the old conditions. According to the terms of all contracts, all materials delivered on the ground become the property of the proprietor, and therefore they should be taken into consideration when the certificate is granted, and payment should be made on account of them. This you may say is liable to abuse in the case of a shaky builder, but by the exercise of some care and tact on the part of the clerk of works and architect in the granting of certificates, I fail to see how any difficulty can arise, and in any case the proprietor is protected as he has the goods, and also the margin of the reserve. With regard to the percentage to be paid, this should, I think, be increased to 90 per cent. If 80 per cent. was the standard twenty years ago, the manifest change in the conditions of trade since and the increase in competition and decrease in profits, fully justifies one in asking for the 90 per cent. Wages have to be paid weekly, and form, roughly speaking, 50 per cent. of a builder's turnover, and this, with the shortened terms of credit, make it most difficult to finance a builder's business; so much so, that no matter how profitable a business you may be transacting, you find it impossible to get on without borrowing from your bankers, for which luxury you have to pay pretty dearly.

As to the amount of the reserve. This, of course, varies with the amount of the contract, but for contracts up to 10,000l., 10 per cent. is, I think, now a generally accepted amount. Beyond that sum, it is a matter of arrangement. Personally I fail to see the necessity of a large reserve or the need of retaining it for any length of time. Much, of course, depends upon the character of the builder, but in ordinary cases I think it is fair to pay half of the reserve at the completion and the remainder at the settlement of the accounts, retaining some nominal sum for a further period of three months, sufficient to make good any defects that might occur in that time. Such an arrangement as this would be an incentive to builders to get their accounts squared up quickly, and much inconvenience and trouble to architects would be saved.

The next clause of importance is one which should make the proprietor liable to pay within a reasonable time after the deposit of the certificate. This is a point which is a very sore one with builders. They are expected to perform their part of the contract, but it is not at all unusual to find that after having obtained (may be, after considerable trouble) a certificate for a payment on account, it takes a further four or five weeks to obtain payment. A clause to protect builders in such cases should be introduced in all contracts, as I am glad to say it is in the forms issued by the builders and the Royal Institute of British Architects. Much trouble and annoyance would be saved also if a clause were inserted whereby payments are to be made at stated intervals, no matter how small or great, then the proprietor would be prepared to meet the certificates as they are presented. The next clause I wish to touch upon is one making the contractor liable for any loss or damage whatsoever to the premises from whatever cause arising and until the expiration of the term of maintenance, and is often introduced into contracts other than those I mentioned. The contractors' liability should cease, as far as loss or damage is concerned, when the buildings are completed and handed over. The maintenance clause I have already touched upon. It is one in which a great deal is left to an architect to decide, and when

he happens to be weak and the proprietor is strong the position of the builder is uncomfortable.

There are two clauses in a form of contract drawn up and used by an eminent firm of architects which are I think worthy of your consideration. The first is the reference clause, which is as follows:—

"The architects shall, during the progress of the works, have the powers above described, and shall be the sole judges in all matters relating thereto as to the interpretation of the drawings and specification as to the execution, condition, and extent of the work from time to time actually executed, as to the quality of the materials used, or to be used in and about the several works, and as to the degree of despatch with which the works should be conducted and carried on, and in all matters of account connected therewith, and as to any question which may arise as to the progress and conduct of the works or deviation from the specification and drawing, and in respect thereof, their decision shall be final. But in case after the building shall be completed any dispute or difference shall arise between the employer or the architects on his behalf, and the contractor in respect of the contract or of anything connected therewith or relating thereto or to any additional works or variations thereon or as to what addition, if any, ought in fairness to be made to the amount payable to the contractor by reason of the works having been delayed through no default of the contractor or by reason or on account of any directions or requisitions of the architects, involving increased cost to the contractor beyond the cost properly attending the works according to the true intent and meaning of the signed drawings and specification or as to the construction of these presents, such difference shall be referred to the arbitration of —"

The point I particularly wish to refer to is that portion which says, "or as to what addition, if any, ought in fairness to be made to the amount payable to the contractor by reason of the works having been delayed through no default of the contractor or by reason or on account of any directions or requisitions of the architects involving increased cost to the contractor beyond the cost properly attending the works executed according to the true intent of the signed drawings and specifications."

Contractors are continually being put to considerable expense by the causes enumerated above, and although it must be patent to both architect and clerk of works that they are fairly entitled to it, I have only once in my own experience heard of an architect granting such a sum, except under pressure. It should be distinctly understood in such cases that a builder is to be paid what is fair and reasonable, and this should be left to the architect, and failing him, arbitration.

The second clause in the private form of contract referred to is as follows:—

"Notwithstanding anything hereinbefore contained the contractor shall not be responsible for the act, default, or omission of any other contractor employed by the employer in or about the execution of any of the works comprised in the specification or in or about the execution of any other works upon the site."

This speaks for itself, and I, speaking from very bitter experience, can testify to its importance.

The preparation of estimates is a most serious thing in a builder's business. Unless he is in a very large way he has to do most of the pricing himself, and when one considers the time this occupies and the number of

estimates he has to send in for every one he is fortunate enough to get, the necessity for the quantities to be as explanatory and explicit as possible is apparent.

In quantities, as with everything else, it is the best that is the cheapest, and I am confident, from my own experience, that the interests of the proprietor and also the builder are best safeguarded if a first-class surveyor prepares the quantities and adjusts the accounts. Much more might be written upon this interesting subject of quantities, but times does not permit.

Another important factor in considering building contracts is the clerk of works, so important a factor that I am of opinion that he deserves a paper to himself. Too much consideration cannot be given by an architect in selecting his clerk of works. One man, if he is not thoroughly conversant with his work both practically and theoretically, may make the work cost 5 or 10 per cent. more than another man, whilst both attain the same result. In many instances they have absolutely no conception as to the duties of their position, but imagine that all they have to do is to see that proper materials are used. My own idea is that the clerk of works should be the architect's representative upon the works, and as such he should be prepared to obtain and give all information necessary to the proper carrying out of the contract; he should be responsible, with the builder's foreman, for the proper setting out of the various parts of the building, and should also, in a measure, be responsible for the time taken to complete the contract. It would be a very good thing if they could be engaged at so much per contract. I think architects would then find their works executed with much more promptitude and despatch.

There are many excellent clerks of works I have had to do with, and I have to acknowledge many kindnesses at their hands, but I really do not think that architects generally appreciate the harm and annoyance which an incompetent or unprincipled man causes a contractor, who in the majority of cases is powerless to complain, for reasons which must be obvious.

In conclusion there are three points in building contracts that I would strongly impress upon architects: 1. The necessity of keeping up all approximate quotations. Nine-tenths of the troubles between architect and builder, and also the proprietor, arise from the fact that in the majority of cases the cost is considerably more than was expected. 2. To remember that it is essential for the good of the community that the builder makes a profit. If he is not allowed to do it fairly, he is, I fear in many cases, apt to do it unfairly. 3. Always be prepared to grant certificates if the money is due. The financial question is a most important one with builders, and whilst there is no difficulty in obtaining the first payment, one has often to write two or three times, without getting a reply, in one's efforts to get further certificates.

Speaking as a contractor who has sufficient capital for the amount of business done, I can honestly state that more worry and anxiety is caused the builder over the question than by any other detail in his business.

The Recinate Fireproofing Company, of Washington, have written the editor of a Windsor paper stating that they desire a suitable location for a factory in Canada.

Mr. James Sclater, proprietor of the White Lime Works, St. Marys, Ont., has been notified by the Dominion Government that he was awarded first prize and a diploma from the Paris Exposition for his material.

BEDDING STONES.

ATTEMPTS have been made to cast doubts upon the correctness of the generally received opinion that it is essential to place stones on the same bed as they occupied in the quarry, says The Architect and Contract Reporter. With some few stones when in place, it may be true that the position of the layers is a matter of indifference; for the Roche de St. Cloud and the Villebois stone of the neighborhood of Lyons, amongst the secondary and tertiary limestones, have been employed without reference to the planes of bed for many centuries without inconvenience. But these cases are decidedly exceptional, and even in them the powers of the stone to resist a crushing weight are less when it is applied in a direction parallel to the beds than when it is applied transversely. In almost every other case it will be found that when stones are used the wrong way of the bed—to employ a workman's phrase—they disintegrate in parallel plates. Great care requires to be exercised to ascertain the precise direction of the natural beds, because many stones present the appearance of inclined planes of deposition, which cut the beds and joints under every modification of angle. When, from the stones having been worked in the quarry, it is difficult to ascertain the precise bed, it is possible that the mason may be misled by the greater facility with which they work in one direction, and may mistake this cleavage for the real bed. The only remedy appears to be to cause the stones exposed to this danger to be marked in the quarry, but fortunately the examples of its occurrence are rare.

SPECIFICATIONS AND TENDERS.

What is the reason that two men will take the same set of plans, specifications and details and be \$5000 apart on a small contract? One might ask this question of some contractors and they would say that it is the difference in the completeness of plans and specifications. One set you can drive a horse and cart through and the other states specifically what kind and quality of material is to be used, yet that same contractor will criticize the architect if he puts everything in his specifications and explains everything carefully; he is apt to say the specifications are too long. Certainly contractors ought to appreciate the fact that the more complete the specification is the more it tells him what is expected, and consequently the longer that specification must be. The mere fact that a specification "covers the floors with good quality spruce boards," as some of them are written, is rather vague and a source of misunderstanding to the clause that calls for "¾ x 5 inch matched, first quality, spruce flooring, laid in long lengths," etc.: and again, picking up a specification a few days ago, reading under the heading of hardware that "the contractor shall furnish and put on proper hardware for the entire building," is vastly different from the man who will give the number and trade name of the various fixtures, so that each and all can estimate on the same quality of goods. It has been suggested that if two men estimate on certain plans and specifications where the kind and quality of every bit of material is mentioned, sizes given, etc., each go into market and get their estimates and the prices of the material amounts to the same, it is a question of judgment who will get out of it at the least possible expense.

The black granite quarries at Meddybemps, near Milltown, N. B., have been purchased by a Boston syndicate.

THE NEWEST THINGS IN WALL PAPER.

AN examination of the leading lines of the season shows a decided tendency toward panel effects and a revival of architectural treatments in paper hanging, says the New York Painters Magazine. All the manufacturers who cater to the demands of the high-class decorators have put on the market this season lines of moiré papers and floral stripes, specially adapted for French panel effects. These are found in soft rose, yellow, pink, green and blue tones, as well as in stronger colors. There is also an endeavor to revive ceiling decoration, but so far this meets with but little success, most of the leading decorators seeming to prefer plain trims, either white or light shades of some color harmonizing with the side wall.

One manufacturer has introduced a decided novelty this season, which is specially adapted to hotel dining rooms and halls, or for theatres and other public assembly rooms. It is a pilaster treatment, having a cut out ornament for the base and another of a different pattern for the top. There is a plain paper which matches and which is used for the intermediate panels. The frieze, which is a bold and flowing design, is so arranged that it members in with the panels and pilasters. It is made in rich colorings, strong reds, yellows and greens, and is remarkably effective. In the cap piece there is a small oval medallion, which is made either ornamented or plain; and in the latter case can be filled in with a gilt initial letter, so as to adapt it more specially for some particular room, such as a hotel cafe, or some similar location. There are many other treatments to which this same paper is adapted, and it only needs to be well known to prove of exceptional value to the decorator who is called upon for striking and original ideas in buildings of this character.

Another novelty of the season, found among the exclusive goods of the manufacturer who is putting it out, is a strictly architectural treatment, to be used in panel effects. The center of the panel is filled with a plain ground having a tiny fleur-de-lis liberally powdered upon it. For the stiles, there is a molding border, printed so as to give the effect of high relief and supplied with the necessary curved corner piece. The frieze gives the effect of modeling in high relief, and is very effective classic treatment of flowing scrolls, and garlands of acanthus leaf foliage. One needs to look at it several times in order to be convinced that it is not an elaborate plaster frieze. The pattern stands out in white against a strong, rich ground color. As a border to the ceiling there is a modillion cornice effect, very similar to the elaborately modeled plaster cornices that are so generally used in Colonial architecture, more especially in rooms of a semi-public character. The ceiling itself consists of square panels, apparently being modeled from plaster in high relief. While such paper hangings violate every principle of art as laid down by Ruskin and William Morris, there is no doubt that they will be found useful in the class of buildings for which they are specially intended, such as hotels, restaurants and other places of like character. They are scarcely adapted to use in private houses. But whether they violate the canons of art or not, they will undoubtedly prove profitable to the first class paper hanger, for it requires skilled workmen to hang goods of this class, and high prices should be obtained for the work.

Chapleau & Leboeuf, contractors, Montreal, are reported to have assigned,

BY THE WAY.

A GENTLEMAN who had an office in the Board of Trade Building, Montreal, writes that when the vault was opened after the fire which destroyed the building, the books and papers which he had placed therein for safe-keeping, were found to have been reduced to dust. The subject of vault construction is one to which greater attention should be given. Unless a vault is constructed in such a way as to be absolutely proof against fire, it is worse than useless, as persons are likely to entrust to its false security their confidence and valuables.

x x x

A GOOD story is going the rounds just now and bears re-telling, says the Irish Builder. A certain country baker had some alterations carried out to his bakehouse, and amongst other things a new oven was constructed, and in due course used. To the surprise of the worthy baker, who had put in a number of barm-bracks, these came out, bearing certain mystic inscriptions, which on closer examination were deciphered as "Sacred to the Memory of," The mystery was soon solved. The sacrilegious contractor had economically utilized the headstones of a demolished church for lining the oven!

x x x

THE colossal statue La Parissienne, which surmounted the principal entrance to the Paris Exhibition and the gateway below have been sold to a contractor for 10,000 francs or about £400. It may be seen that the contractor made a good bargain when it is stated that in addition to the value of the statue as an historic feature of the great Exhibition, the gate consisted of nearly 205 tons of iron, 6,700 cubic feet of wood, 1,600 square feet of brick, 25,000 cubic feet of stone, and 7,500 panes of coloured glass.

x x x

REFERRING to the steadily growing fire loss in cities and the claim of the insurance companies that they are unable to realize profits at existing rates, the American Architect says: "The high department stores which give our conscientious building inspectors so much anxiety might be transformed in a week if the underwriters themselves would have the resolution to make the premium rates on them proportionate to the risk; but the temptation of a large line of insurance is too much for them to resist, and by keeping down rates on dangerous accumulations of goods, trusting to be able to make up their losses at the expense of the smaller and safer risks, they encourage the methods of building which they rail at architects for not suppressing. If the underwriters really wish to "reduce the fire-waste in our cities the way to accomplish that end is to second heartily the building inspectors in their efforts to have the undivided space in mercantile buildings restricted by law within prudent limits; to use their influence for the repeal of the customs duties on structural iron, and to urge, in the several States, the passage of laws restoring neighborhood liability in case of fire. When these three objects are accomplished, it will not be long before great fire losses are quite as rare in our cities as they are in Paris or Vienna, and the underwriters, who alone have the influence necessary for bringing them about, will be prosperous and happy again, at the same time that they will have conferred upon their fellow-citizens an inestimable benefit."

The Maritime Art Glass Works have become successors of the Maritime Glass Company, of St. John, N.B.

SLATE DEPOSITS IN NEWFOUNDLAND.

Extensive deposits of slate suitable for roofing and school purposes have been discovered in Newfoundland, and are attracting much attention in England owing to the fact that the deposits in Wales threaten to become exhausted, with the result of putting an end to an extensive industry in which many thousands of workmen have found employment. There are from 15,000 to 20,000 slate workers in North Wales, about whose future great anxiety is felt, and unless new fields are found they will soon be without employment. The attention of the great slate capitalists of Wales has been turned to Newfoundland, and an expert is to visit the island to prospect for slate. If found in sufficient quantities a great company will be formed, and colonies of Welsh slate workers will be sent out. The development of this new industry will give a large amount of employment and pour wealth into the colony. This island contains immense deposits of the finest roofing slate. A single quarry in Smith's Sound, Trinity Bay, was sold last year for \$25,000.

A large portion of the Avalon Peninsula is of the Cambrian formation, in which the best roofing slate is found. It was only towards the close of 1899 that this slate was known to possess any economic value. Attempts had been made previously to work certain quarries without success. Now, however, that it is known the good slate quarries in North Wales are approaching exhaustion and that no more deposits are in sight, the value of slate is rapidly advancing.

The Hon. Charles Walcott, director of the Geological Survey of the United States, who examined the deposit in Smith's Sound says in his report: "This is one of the great roofing slate deposits of the world, comparable with that of North Wales and the American deposits of Washington county and Rutland county, Vermont." The Trinity Bay deposits extend in one direction to Bonavista Bay, and in another direction, dipping under the sea, it reappears at Paradise Sound, Placentia Bay. At Bay of Islands there is a large deposit of the best quality on one of Mr. R. G. Ried's concessions, through which the railway runs. It is likely to prove to be of great value, as it is of the school slate variety. Thus a substance supposed to be of no economic value is suddenly found to be of vast importance to the future of the country. It is not impossible that in the near future the slate of the country may rival its copper deposits in value.

Among the workmen at Smith's Sound many hail from Llanberis, Carnarvon, Beddgelert, Bethesda, Nant Ffrangton and Portdinorwic. There are also a few American Welshmen who have come from the quarries at Vermont because the wages are higher at Smith's Sound quarry than in the States. For the present as many workmen are employed in the quarry as can be accommodated, but it is expected there will soon be a demand for additional hands, as the quarry is being further developed, and it is probable that other quarries will soon be opened, as the slate deposit is so extensive.

In the treatment of a house there must be first of all a plan, from which the decorating and furnishing may be worked out. Not that there must be one idea running through the whole house—there must be rather a succession of ideas. Each room must have its distinctive character, and everything used in its decoration and furnishment must be in harmony with the prevailing thought.

A NEW CEMENT TEST WANTED.

HERR M. Gary, of the Royal Technical Experimental Laboratories, Berlin, has recently reported upon the practical value of accelerated cement tests. Some years before, says the British Clayworker, these tests, including the celebrated boiling test, had been reported upon; and notice was taken of the circumstance that some brands of cement in considerable vogue did not come out at all well under the tests. Further inquiry was therefore directed to ascertain whether the tests were misleading, or the cements bad. In some examples the cements were unquestionably unsatisfactory; but in others, works executed with them stood perfectly well, although the cements themselves failed under test. In one remarkable instance, a cement was thoroughly marked with cracks in the drying and heating tests, completely boiled away in the boiling test, and cracked on the surface and rim in pat tests in water after two years. It came out unusually well in actual practice in very heavy masses of masonry. Various engineers were asked to report upon the behaviour in actual structures of particular brands of cement which passed the standard test for soundness, but not the accelerated tests. They all came out fairly well. Four of the specified cements were used in building a municipal gas plant, especially a concrete gasholder tank. One of these cements was made by the wet process from white chalk, and was slow-setting and of standard fineness. All but one tension test was up to the standard. The drying test was generally passed; but the boiling test never. Other parcels were differently made; but they all completely answered their purpose. The inference drawn is that for rough and strong work cements which fail to satisfy the drying, heating and boiling tests may yet be quite good. Even cements which do not come up to the standard requirements for strength can still be used to advantage in building. The one thing needed in the further study of cements, as Herr Gary thinks, is to find out exactly how much sand a cement will carry and yet give at the end of a definite period a definite strength. That would be a very much more useful kind of test than those at present in use. Obviously, cement which is as good at 1:8 of sand, as another brand is at 1:6 of the same sand, is so much the better for the user. The ordinary tests do not show this quality.

TORONTO BUILDERS' EXCHANGE.

It is gratifying to learn that the membership and interest in the Toronto Builders' Exchange have increased to such an extent as to necessitate the removal of the Exchange to more commodious quarters. These have been found on the first floor of Yonge Street Arcade, where the Association now occupies three large rooms with about double the amount of space available in their old quarters. These rooms comprise a reception room, reading room and board room, and have been fitted up in a manner to afford the greatest facility in the transaction of the business of the Exchange, as well as for the comfort of the members.

A putty for repairing broken stone is made by reducing the following ingredients to powder:— Mix altogether in a mortar, and make into a thick putty with water just before use— ten parts of clay, four parts of fine iron filings, two parts of peroxide of manganese, one part of common salt (sodium chloride), and one part of borax. The heat will harden this cement. A cement for a similar purpose that will resist a very high temperature is prepared by making into a paste a solution of silicate of potash and borax, one part of sulphate of barium, and two parts of clay.

NEW BUILDING AND PLUMBING BY-LAWS
FOR MONTREAL.

THE city council of Montreal have recently adopted the major portion of the new building by-law prepared under the direction of the Province of Quebec Association of Architects. We hope to be able to present to our readers further particulars regarding this new by-law in our April issue. A new plumbing by-law is also under consideration and is expected will be finally passed at an early date.

HOW TO WATERPROOF A BASEMENT.

A report has been presented describing the system employed in waterproofing the basement of the Government printing office at Washington. The soil is sandy and porous, and ground water is abundant. New drains and damp courses were put in and the walls were lined with plates of Neuchatel asphalt, brought to the proper consistency by the addition of minute quantities of bitumen and Trinidad asphalt, and a large dose of very fine gravel. On horizontal surfaces it is simply spread hot to a thickness of about a quarter-inch. For application to vertical surfaces it is first moulded into plates on a burlap backing, crushed slag is sprinkled over it and bedded to about half its depth in the hot asphalt. The surface of the wall is plastered with Portland cement mortar, and while this is still soft the asphalt plates, which have been allowed to cool, are pressed up against the wall so as to bed the projecting particles of slag in the plaster. The plates are held against the wall by suitable braces until the plaster has set hard. The braces are then removed, the burlap stripped off and the joints between the plates are closed by heating with a painter's hand furnace and smearing with a hot asphalt mixture, which makes the entire surface continuous. Neuchatel asphalt was used because of its well-known durability in the presence of moisture, and because the mixture of asphalt and gravel could be made sufficiently hard to cover the foundations without squeezing out under the weight of the superstructure, as coal-tar or similar compounds would do. The waterproofing appears to be a success, but the contractors were required, however, to guarantee it for five years.

NOTES.

Mr. P. W. St. George, manager of the Electric Fireproofing Company, of Montreal, is on his way to England.

The Michigan Portland Cement Company, of Quincy and Coldwater, Mich., have recently opened a warehouse in Winnipeg.

New machinery to the value of \$50,000 is being installed in the terra cotta works of Messrs. Hinde & Brownswold at Anvik Island, B. C.

George Battye, of Halifax, manager, announces the re-opening of the Battye Freestone Quarry and Brick Works, which were established in 1809.

A committee of the builders and contractors of Kingston, Ont., has been appointed to consider the advisability of establishing in that city a Builders' Exchange.

The Davis & Pangburn Reversible Window Company, of Chicago, is said to be about to establish a factory in Canada, and are looking about for a suitable site for this purpose.

Brown ash woodwork may have old red walls, the frieze of old blue, the cornice of buff, and the ceiling of a lighter shade; while the upholsterings may be of old gold, red, and blue, and draperies of grey.

The National Portland Cement Company, Limited, of Toronto, has been incorporated with a capital of \$1,000,000, to manufacture cement, marl, bricks, lime, etc., and for other purposes. This company is a branch of the National Portland Cement Company, of Jackson, Mich. It is understood to have obtained options upon

large cement deposits in the county of Grey, and that it will erect extensive works.

Cream woodwork may have a soft, warm blue wall with a frieze of ivory tones, with blue tracery, cornice the same tones as the frieze, ceiling of ivory pink, and the upholsterings and hangings of muddy amber.

The National Iron Works, Limited, of which Mr. John Galt, C. E., is president, and Mr. W. C. Bullock managing director, are erecting works at Wingham, Ont., for the manufacture of valves and waterworks supplies. The company will be the Canadian manufacturing agents for Messrs. Glenfield Kennedy & Co., Kilmarnock, Scotland.

Finds of Aztec antiquities occur almost daily in the course of sewer construction work on the streets in the rear of the cathedral of the city of Mexico. Recently a stone lion's head eighty centimetres in diameter was discovered. This is an unprecedented find in Mexico. In addition to this two sculptured figures, each fifty centimetres in height, were found.

At the Pilkington Glass Works, in Lancashire, after a series of experiments, unbreakable, fire-proof and burglar-proof glass has been produced. To the molten glass is added a powerful wire, which produces the desired effect. Doors of this material proved unbreakable, and when subjected to 2,500 degrees Fahrenheit, remained unaffected, while ordinary doors grew red hot.

A veteran contractor of Prescott, Ont., in the person of Mr. Nessfield Ward, Sr., passed away at Brockville, Ont., at the age of 76 years. The late Mr. Ward, who was a native of Yorkshire, England, had resided in Prescott for over half a century, where he succeeded in 1854 to the contracting business of his father. He was the builder of many important structures in that locality.

Messrs. Evans, Coleman & Evans of Vancouver, have recently purchased all rights in an extensive marble quarry located at Sumas, together with deposits of material suitable for the manufacture of cement. It is said to be their intention to establish quarrying and polishing plants and lime kilns together with cement works, with an output of 300 barrels per day, at a cost of \$200,000.

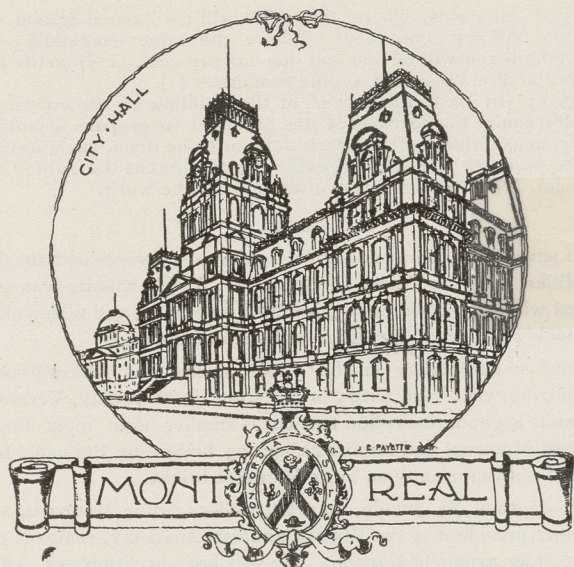
Mr. W. H. Knowlton, of Toronto, is now in England making arrangements for a test of Canadian iron ore in the production of scoria, which is made from iron slag. All ores are not suited for making scoria, but it is believed that a half-cargo of ore from the Helen mine which Mr. Knowlton sent over will be found to produce a scoria slag. If this should prove the case it is likely that scoria for the Canadian market will in future be made at some of the Ontario blast furnaces that use the Helen mine ore.

The very best, though not the cheapest way, to finish white pine, says the Painters' Magazine, is to see that the work is well sandpapered with the grain, then thoroughly dusted. Give at least one coat white shellac varnish and one coat of inside varnish; if this is too expensive, substitute liquid filler for the shellac. For hard or yellow pine finish, apply one coat orange shellac varnish and one or two coats light hard oil finish, or omit the shellac and apply hard finish instead. A filler is not required for this wood.

According to numerous experiments made by M. Von Blase, it results that a proportion of less than 5 per cent. of magnesia has no injurious effect on the properties of Portland cement. In the case of poor mortar the proportion of magnesia may attain 8 per cent. without any danger, provided that other conditions are fulfilled. It is time, says the author, to put an end to the discussions regarding this subject, and to officially fix 5 per cent. as the limit for magnesia, because this proportion is admitted not to cause any inconvenience.—*Moniteur Scientifique*.

The elevator shaft of a building is generally the weak spot as far as fire is concerned, and in case of fire the top of the shaft is exposed to great heat, owing to the fact that the shaft itself acts like a chimney and supplies the draft which causes the fire to spread. If the top of this shaft can be made fire proof the danger can be greatly lessened. This may be accomplished by building a wire cage on the roof, over the shaft, and covering it with several layers of cement, which is then allowed to harden.

A tunnel through two and a half miles of solid granite has been successfully accomplished in the United States, where it has been necessary to cut through the Cascade range of mountains. This work is considered one of the most notable engineering feats of the century. Boring was started at each end towards the centre, and so accurate were the engineers' calculations that at the meeting point the difference of alignment was scarcely one inch. The cutting through refractory material was accomplished in 45 months by 800 men, operating 32 compressed air drills.



Branch Office of the CANADIAN ARCHITECT AND BUILDER,
Imperial Building.

MONTREAL, March 15th, 1901.

THE SPRING EXHIBITION.

The annual exhibition of pictures at the Art Association's galleries was opened on Friday, March 8th, and will remain on view until the 23rd inst. As usual there was not much interest shown in the architectural drawings, but then we regret to say there was little in which to take interest. Outside of Mr. W.S. Maxwell's drawing of a "Salle des Fetes" made by him during his recent stay in Paris in the "Beaux Arts" style of rendering there was not much of note, and in point of numbers the exhibition was woefully wanting. Mr. A. T. Taylor exhibited a water color sketch of the Merchant's Bank building for Winnipeg and a sketch of a small bank building at Sydney, C. B. The latter is a type of building which should be largely in demand in Canada as there will, no doubt, be several small towns cropping up in the next ten years desiring buildings of this class. Why do not persons interested in the arts and crafts exhibit drawings and sketches of decorations and interiors, ornamental grills, and other iron work, lamps, etc., and such work as is to be seen in the pages of the Studio? Surely there is a growing demand for these things in Montreal, and the ladies who are generally interested in interior decoration have a field open here for them. The exhibition of china painting certainly seems to have called forth the energies of the ladies, and we give them hearty praise for the display which does them credit.

THE BOARD OF TRADE FIRE.

The recent disastrous fire which demolished the Board of Trade, besides several other buildings in that district, has occurred since our last letter. The lessons to be learnt therefrom were chiefly those which ought to have been learnt long ago, viz., the lack of men and apparatus in the fire brigade; the great drawback received from the net-work of telephone and electric wires in a congested district; the fact that a fire wall is about the only thing that will stop a large conflagration, and the necessity of better, that is, fireproof buildings, in the centre of a large city. The improvement of the fire brigade is out of our province, except when we are commissioned to build a new fire station, and we would like to urge here that the city council be called upon by an amalgamation of the art interests of the city to insist upon either competitive plans or a competent local architect being employed for any new fire stations that may be required, and are evidently badly needed according to the report made recently by Mr. Howe to the Canadian Fire Underwriters.

Concerning the numerous wires we would like to add our voice to that of others in recommending that the city council enforce the various companies in the congested district, that is where the insurance companies have raised the rates, to place their wires in a large conduit underground. If need be this could surely be done by an outside company and space rented out and thereby make a good pecuniary profit to themselves, and at the same time do the citizens as a whole a lasting benefit. There is no doubt that the overhead wires are a menace to the public at all times, while in the event of heavy storms or a fire they are a danger that is too great to be trifled with and a great cause of expense to the companies, that one would imagine for their own sakes any attempt to force them to place them underground would not be met with any very strong opposition.

From an architect's standpoint there is the further disadvantage in the ill effects they have on the vista down some of the chief streets of this city with whole rows of poles carrying their network of wires.

Montreal is gradually growing to be one of the large cities of this continent and in which fierce commercial competition is being met on all sides, and merchants have now to compete against merchants from all over the world. They can, therefore, ill afford a raise in the insurance rates, as they have by force of circumstances to scrutinize every item of expense. Merchants can also, as a rule, ill afford to have a fire, as an interruption of their business generally means their customers going over to a competitor. They should, therefore, look beyond the first cost of a building and see that they are protected somewhat against loss by fire. Do not blame the insurance companies for the raise in the rates, but blame yourselves, ye who build such firetraps as are to be seen throughout the city. Can one blame the insurance men when there are buildings in the centre of a congested district with absolutely no protection whatever against fire—no sprinklers, no standpipe with hose connections,—or even if there is a standpipe a hose without a nozzle, as can be seen in one of the largest office buildings in this city. Such things should not be allowed, and if persons who own such property have not more thought for the lives and property of their tenants there should be some law which would enforce them to do so.

THE LICENSING OF ARCHITECTS.

The question of the value of licensing architects should be of vital importance to all those concerned in the welfare of the profession in the Province of Quebec. As is well known "no person" in this province can take or make use of the name or title of architect, either simply or in connection with any other word, name, title or designation, giving it to be understood that he is an architect under this act unless he is registered under this act as a member of the said association. Any person since 1898 using the word "architect" in the Province of Quebec, unless registered, is subject to a fine not exceeding twenty-five dollars (\$25.00) for the first offence and not exceeding one hundred dollars (\$100) for every subsequent offence.

In the State of Illinois, the only state at present with a license law in the United States, all architects after passing the final examination are given a seal with their name and address impressed thereon with which all plans emanating from their office have to be stamped; and further-more, no building permit will be issued except on plans so stamped with the seal of a licensed architect. This appears to us to be carrying the thing too far, as no man should be hindered from erecting buildings from plans of his own, or without any plans for that matter if he so desire, but he should be restrained from employing another person to make plans for him who is not a licensed architect. A man can doctor himself or plead his own case in court, but in neither case can he practise medicine or law without a license. In New York State they are now discussing the pros. and cons. of licensing architects, as a bill is before the legislature. There seems to be opposition both from some of the architects and the general public, and the outcome seems doubtful. The chief points usually brought to bear against a bill for licensing architects is the undoubted impossibility of testing the artistic merits of a candidate by an examination. This is almost universally acknowledged to be a difficulty, but it is possible to test whether he knows the rules governing both the artistic and the scientific sides of his profession. Any person practising architecture, which is now generally acknowledged to be one of the learned professions, should be able to pass a general examination equal to the standard required by the medical or legal fraternity. He should further-more, in a final examination, be able to pass in the following subjects: Perspective and free hand drawing; shades and shadows; mechanics; elementary geology and botany; hygiene; modelling; building construction and materials; pen and ink drawing and wash work; colour and decoration; history of art and architecture; design; specifications and contracts; architectural jurisprudence.

Of course a candidate might pass in all these subjects very creditably and yet not make a "great" architect, but at least one would know that he was in a position to build safely and correctly and would not contravene all rules of good taste. This is as much as can be said of any profession, and there will and almost be many grades in every calling. There is now undoubtedly a growing tendency on the part of the general public to appreciate intelligently the difference between good and bad in architecture, and it is the duty of all architects to keep out of the profession all those who hinder its progress.

Now that the Quebec Association has received its charter and has had time to get down to work, it is high time that something should be done to teach students, as this responsibility has by this charter been thrown upon the shoulders of the Association. There is at the present time no attempt to do anything to further the interest taken by students or to place before them the opportunities for serious study. It is the earnest desire of many to see some form of study in the way of lectures, modelling classes, etc., and also monthly competitions started by the Association, and we trust if too late for this season, there will not be another year pass without some effort by all the members to see that this blot does not remain on our work. Surely the Association could join the American League and so obtain the circuit drawings as was recently done by the Toronto Architectural Eighteen Club. "The Brickbuilder" recently commented on that exhibition by saying, "The first Architectural exhibition of any pretensions ever held in Canada occurred in Toronto, January 26th to February 9th, under the auspices of the Toronto Architectural Club, and from all points of view it was voted a success and heralded as a permanent entry on the part of the architects of Canada into the progressive movement for the advancement of architecture and municipal arts." Let not this progressive movement stop until it at least includes Montreal, and it is a splendid opportunity for both members and students to compare their work with that which is being done by others, and there is nothing like a healthy comparison of work to make and stimulate an interest in one's own. We would like to suggest that the Association should offer prizes for monthly competition during the winter months, the prizes to be given on a vote of members, as is done in the T Square Club. Possibly some of the honorary members might be glad to offer a prize or medals, and I fancy one or two at least would certainly come forward if asked. Surely the days ought to be past when men were afraid lest some one else should steal their ideas and so frustrate any attempt at co-operation or "esprit de corps."

SCHEDULE OF CHARGES OF THE P. Q. A. A.

An order-in-Council was passed by the Quebec Legislature on the 8th inst., legalizing the schedule of charges of the Province of Quebec Association of Architects, as follows:

No. 1—The architect bases his professional charges upon the entire cost to the owner of the building when completed, including all the fixtures necessary to render it fit for occupation, and is entitled to extra compensation for furniture and other articles designed or purchased by the architect.

No. 2—If any of the material or work used in the construction of the building be already upon the ground or come into possession of the owner without expense to him, the value of said material or work is to be added to the sum actually expended upon the building before the architect's commission is computed.

No. 3—Travelling expenses are to be paid by the client.

No. 4—The charge per day which may be made by an architect will depend upon his professional standing, but the minimum charge will be \$10 per day.

No. 5—In all cases where an architect is subpoenaed professionally as a witness in court, he shall be entitled to a fee of \$4 per day of attendance.

No. 6—Drawings and specifications, as instruments of service, are the property of the architect.

No. 7—In consideration of the charges mentioned hereafter, the architect will be held to furnish a series of drawings and specifications as originals, and copies of these same drawings and specifications for the use of the contractors, but it will be well understood that all the originals and copies must be returned to the architect when the work will have been completed.

No. 8—For professional services in connection with all buildings, comprising preliminary studies, complete plans, specifications, details and superintendence, the architect will be entitled to a commission on the total cost of the building when completed, in the following proportion:—

On all classes of buildings costing less than \$50,000, 5 per cent.

On all classes of buildings costing from \$50,000 to \$150,000, 4 per cent.

On all classes of buildings costing more than \$150,000, 3 per cent.

No. 9—Partial charges, in the case of subdivision or discontinuation of the work, will be as follows:—

For preliminary studies (sketches), one-fifth (1/5) of the above charges:

For complete plans and specifications, including the preliminary studies, one-half of the above charges (1/2).

For details, one-fifth (1/5) of the above charges.

For superintendence of the works, when drawings are not furnished, two and one-half per cent. (2 1/2) on the cost of the works.

No. 10—In exceptional cases, for all works of alterations or of restoration, the architect will be entitled to a commission of seven and one-half per cent. (7 1/2) of the cost of the work.

No. 11—For all other work (also exceptional) in which the expenditure is mainly for artistic workmanship, viz.: For monumental work, fittings and furniture, and for decorative work, stained glass and such like; the architect will be entitled to a commission of seven and one-half per cent. (7 1/2) on the total cost of the work.

No. 12—For valuations of property requiring measurements and

detailed estimates, where the value will not exceed \$5,000, one and one-half per cent. (1 1/2). Where the value exceeds \$5,000, the commission will be one and one-half per cent. (1 1/2) on the first \$5,000, and one per cent. on the remainder (1).

No. 13—In case the owner of the building or the contractor should require the services of the architect to prepare quantities or for measurement of the work done or to be done, such services will be paid (outside of the regular commission) at the rate of two per cent. (2) on the valuation of the cost of the work.

NOTES.

On severing a connection covering seventeen years with the firm of Millar Bros. & Toms, Montreal, Mr. A. M. Elliott, was presented with a gold watch by his fellow employees and with a chain and locket by Mr. J. D. Millar on behalf of the firm.

Another competitor in the brick market has recently been heard from, viz., "the Drury brick" from Essex county, Vermont. It stands a good absorption test but is smaller than most bricks made in Montreal and requires about 23 bricks to the cubic foot instead of from usually 20 to 21 Montreal bricks.

The death of Mr. Jacobi, an artist well-known in Montreal, and a former president of the Royal Canadian Academy, removes one of the older artists in Canada. He was born in February, 1812, at Königsberg in Prussia and came to Canada in 1860, where he remained, with the exception of a short absence, until shortly before his death, which occurred in Dakota.

The result of the recent examinations for the Architectural Association has just been posted: H. C. Stone, of Montreal, and Pierre Levesque, of Quebec, are granted licenses to practise as architects in the province, and the following passed the preliminary examinations: Sholto Smith, of Montreal, J. J. T. Donnelly, E. P. Raymond and Charles A. Lemay, all of Quebec.

Mr. Dore, sanitary engineer, Montreal, examined during the month of January 17 building plans, visited 147 homes where plumbing required inspection, issued 16 notices about improper workmanship, and issued four plumbers' certificates. He complains that many plumbers are using lighter material than the by-law calls for.

Mr. J. O. Marchand, who enjoys the distinction of being the only Canadian student of architecture at the Ecole des Beaux Arts, at Paris, has recently resumed his studies after having paid a brief visit to his parents in this city. Mr. Marchand expects to obtain his final diploma in June, after which he will begin the practice of his profession in Montreal.

Mr. Charles Philippe Hebert, the Canadian sculptor, has been made a Knight of the Legion of Honor by the French Government in recognition of his services to art in France and Canada. The Maisonneuve monument in this city, a group of historical figures on the facade and in front of the Legislative Buildings at Quebec, and the statues of Sir George E. Cartier and Sir John A. Macdonald, at Ottawa, are among his most important works.

It is announced that from May 1st until June 30th classes in drawing, painting and modelling, open to men and women students, will be held in the rooms of the Architectural Department of McGill, under the direction of Prof. Henry F. Armstrong. The rooms will be open on week days from 10 a.m. to 5 p.m. Students may pursue their studies in one or more of the subjects continuously every day. Teaching and criticism will be given daily during the above hours, except on Saturdays. The subjects taught will be:—Freehand drawing, in lead pencil and in charcoal, for students preparing for, or engaged in, any branch of art work, and in lead pencil, for engineering and other science students; oil painting and water color painting; and modelling in clay and casting in plaster.

Prof. W. R. Butler read some abstracts before the Canadian Society of Civil Engineers on February 28th from two papers recently given before the Liverpool Engineering Society, termed "The Characteristics and Qualities of Portland Cement" by Mr. P. A. H. Shaw, and "Experiments on the Artificial Acceleration of the Setting of Portland Cement," by Mr. F. E. Priest. In the first paper the importance of fine grinding was particularly emphasized and in speaking of the value of weight as a criterion of quality the author showed the variations in the weight of samples of the same cement at different ages as follows:

At age of one day, weight 117 lbs. per bushel.			
"	1 month	"	113 "
"	2 months	"	108 "
"	12 months	"	103 "

And as examples of variation in weight due to fineness in grinding the following were quoted:

10%	residue on 80 mesh sieve weighed	110 lbs. per bushel.
20%	"	80 " " 116 " "
25%	"	80 " " 121 " "
35%	"	80 " " 123 " "

The above figures should be of interest to architects as well as engineers. J. R. G.

MANUFACTURES AND MATERIALS

THE MARITIME CLAY WORKS COMPANY, PUGWASH, N. S.

(Correspondence of the CANADIAN ARCHITECT AND BUILDER.)

During the past two years a new and modern brick making plant has been in process of construction in Pugwash, N. S.

The clay beds form a solid bank, twenty-five feet high and about a mile in length. The quality is extra good, some experts say among the best they have ever seen, and there is not a stone to be found in it.

The railway was constructed last summer and is fitted with a locomotive and good rolling stock. It terminates in the factory over a high trestle so that cars may be run up over the machinery and easily dumped. The sand is obtained from the harbor shore, a few hundred feet from the mill and is of clear and even quality in inexhaustible quantities.



WORKS OF THE MARITIME CLAY WORKS COMPANY, PUGWASH, N. S.

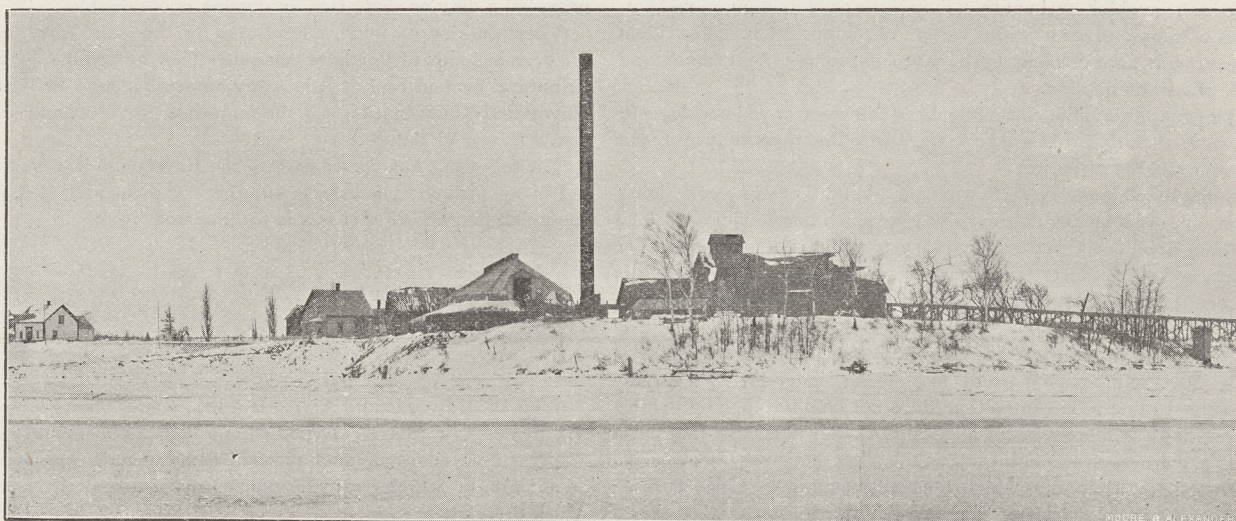
This has now been completed and for some time has been turning out heavy shipments. It is undoubtedly the largest in the Maritime Provinces and is thoroughly modern in every respect ranking among the finest in the Dominion.

The natural advantages of the site were good and the clay and sand required were in close proximity, of the best quality and inexhaustible. There were old clay works here forty years ago and some of the old buildings still stand, but they were quite small.

Robert Brownell, of Truro, was one of the early promoters of this concern. The late Hon. Mr. Dickie, of Amherst, saw the ad-

vantages of the site and laid out as conveniently as possible. The buildings are all of brick, and are covered with heavy galvanized iron roofs. The main building is of size about 75 x 100, including the shed for clay, etc. The engine and boiler rooms are attached, of a size 30 x 24. The engine is of 80 h. p., and there are three boilers, two of 75 h. p. each and one of 50.

There is some large and powerful machinery in the machinery building. All his apparatus came from Bucyrus, Ohio, and is of the latest pattern. The wire cutting machinery



WORKS OF THE MARITIME CLAY WORKS COMPANY, PUGWASH, N. S.

vantages of the site and took up the work, furnishing until his death much of the means for construction. After that event the present members of the firm bought out the stock and plant and have since made great changes and improvements to the plant.

The present members of the company, incorporated in 1898, are Alonzo Smith and R. M. McDonald, both natives of Pugwash. They are both good business men and are opening up the business as thoroughly as it can be done.

The plant is located immediately across the river from Pugwash and is connected with the clay beds, one and a half miles distant, by a railway which is the firm's property.

has a capacity of 35,000 bricks per day. The dry press machine has a capacity of 20,000 a day, though it is not generally operated at that speed. The dry house is about 100 x 40 of 6 chambers and with a capacity of 40,000 per 24 hours. The exhaust steam from the engines goes into the dry house. A fan which will be put in this winter will increase the capacity to about 50,000.

The old wooden kilns at first used have been done away with. The plan of the new continuous kiln were obtained in California and is the only one of the kind in the Maritime Provinces. The size is 164 x 52, and its capacity for the 18 days required for a burning is 450,000.

The daily capacity of this kiln is just about 35,000. Its construction requires care and skill and its cost was great, but is well justified by results. The mouths or doors to the chambers are closed and cement sealed during burning. The contents of a chamber may be removed and the chamber be filled again while the rest of the chambers are in full heat. Coal is used, and this fuel, in very fine condition, is fed through many small intakes overhead, sifting down through the bricks to the bottom. There are 1,200 or more of these feeding holes, of a diameter of about 4 in., each provided with a cover. This new kiln was just started last September.

As much as 35,000 stock and 10,000 pressed brick have been turned out in a day. All future orders can be filled up to 30,000 bricks per day.

A small artificial kiln stands near the continuous one, which though only of about 12 feet diameter and 10 feet high, has a capacity of 17,000.

In the spring a new building 20 x 40 is to be constructed to contain burned and dry bricks. Then all parts of the work and stock will be fully under cover. New tracks will be laid to the wharves and other improvements carried out.

The large chimney belonging to the works is 140 feet high and over 6 feet in inside diameter.

About 40 men are now employed in the works. So much machinery is now used the old number has been much lessened.

Altogether the plant has cost about \$62,000 including from \$4,000 to \$5,000 for site and about \$3,000 for rolling stock.

Large shipments have been made to Sydney to the Dominion Coal Co., the Dominion Iron and Steel Co., N. S. Steel Co. and Rhodes, Curry & Co., Cumberland Coal Co. (160,000 M). Orders are in hand for a quarter of a million to Sydney, about 1,000,000 to Prince Edward Island and half a million to Pictou county. A considerable quantity has been shipped to New Brunswick, including an order of 20,000 to Kingston.

At present the bricks are taken over the river to the railway a distance of some few hundred yards in lighters and tugs, but it is the intention to put in a wire cable carrying system which will solve this difficulty.

More business has been found than was anticipated, and the operation of the new plant is in every way successful.

THE COMPOSITION OF SOME CANADIAN LIMESTONES.
(A) For Calcium Carbide ; (B) For Chemical Wood Pulp ; (C) For Portland Cement.
BY J. T. DONALD, M.A., Montreal.

The rapid development of industries in which lime or limestone is a raw material has given a new interest to this common mineral. The term limestone, however, as generally used includes any rock in which carbonate of lime is the predominant ingredient. This of course gives a wide range of composition. The ideal limestone is pure calcium carbonate containing 56% of lime and 44% of carbon dioxide.

The conditions under which beds of limestone have been deposited were such that it is scarcely possible to find them fully up to our ideal in degree of purity.

Being a sedimentary rock, we usually find limestone containing more or less siliceous matter, either as silica or as silicates. The amount of siliceous matter may vary from a few tenths of one per cent., up to even forty or fifty per cent.; in which latter case it is a question whether we should consider we have a sandy limestone or a calcareous sandstone.

But again, in nature we usually find that carbonate of lime is associated with carbonate of magnesia ; indeed it is scarcely possible to find a limestone that does not contain an appreciable percentage of magnesia ; whilst on the other hand the magnesia may occur in such percentage that the stone becomes a magnesian limestone or Dolomite, which normally contains : Lime 30.40% ; Magnesia 21.70% ; Carbon dioxide 47.90%.

In addition to silica or silicates and magnesia, all limestones contain more or less of what someone has aptly called the "Intruder into everything on earth" viz., iron in the form of iron oxide or iron sulphide.

The principal industries that call for limestone as one of their raw materials are : Calcium carbide, Chemical Wood pulp, Portland cement.

The object of this brief paper is to state in a general way the characters of the limestone required in each of these industries, illustrating by reference to Canadian limestones that have been analysed by the writer.

(A) Calcium carbide.—A limestone to be suitable for the manufacture of this article should be as nearly as possible pure Calcium carbonate. The presence of magnesia is particularly detrimental. A small percentage of siliceous matter and a little iron oxide may be tolerated. These points are illustrated by the following analyses ; 1 is being used in a Canadian Carbide works ; 2 and 3 are unsuitable for Carbide : 2 because of the magnesia it contains ; and 3 on account of the high percentage of siliceous matter.

	I	II	III
Insoluble.	...	2.14	10.92
Carbonate of lime	96.89	52.00	87.71
Carbonate of Magnesia.....	1.64	42.71	.30
Iron Oxide.....	...	2.20	.70

(B) Chemical Wood Pulp—For soda pulp, i. e. pulp made by "cooking" the spruce or other wood in a solution of Caustic soda, any ordinary good lime-stone will yield a lime suitable for causticising the soda.

But in the case of Sulphite pulp, it is otherwise; selected material is required. In this case the presence of magnesia is desirable, indeed the higher the percentage of magnesia, the more desirable is the stone. But iron is decidedly objectionable; its presence causes discoloration of the pulp.

The following analyses are of Canadian limestones.

I is an excellent stone for sulphite pulp. II whilst good in other respects contains too much iron. III does not contain sufficient magnesia.

	I	II	III
Insoluble.....	2.10	2.14	.14
Carbonate of lime.....	56.21	52.00	98.78
Carbonate of magnesia.....	41.20	42.71	Traces
Iron oxide.....	.09	2.20	.19

(C) Portland Cement—This article is made by calcining a mixture containing proper proportions of silica, lime and alumina; this is usually a mixture of limestone and clay. A somewhat wide range of material is admissible in this industry. Magnesia is debarred to the extent that the finished cement must contain less than 3% of magnesia.

A limestone comparatively high in silica is admissible here provided a clay or shale rich in alumina is obtainable.

A certain kind of impure limestone is the sole raw material for certain kinds of Portland cement. This is commonly known as natural cement rock. It is really an argillaceous or shaly or clayey limestone; that is, it is the materials for Portland cement ready mixed by nature.

The following analyses illustrate the statements just made.

I is an ordinary limestone suitable for cement. II contains too much magnesia. III is a natural cement rock.

	I	II	III
Insoluble.....	1.51	20.23	24.74
Carbonate of lime.....	97.21	50.37	41.80
Carbonate of magnesia.....	1.15	24.63	8.60
Iron oxide.....	.17	2.81	6.30

John W. Edwards and A. T. Hughes, slate manufacturers of Granville, N. Y., have returned from a trip to Newfoundland, and express themselves as much pleased with the slate prospects. A syndicate, in which Granville parties are interested, is now at work there.

The
New

SOLAR PRISMS

are the BEST
and CHEAPEST

Manufactured by the Solar Prism Co., of Cleveland, O., U.S.A.

The **N. T. LYON GLASS CO. Limited**, 141 Church Street, TORONTO

AGENTS FOR CANADA

A CORRECTION.

Toronto, Feb. 28th, 1901.

Editor CANADIAN ARCHITECT AND BUILDER.

SIR,—Mr. Bishop, Architect of the Public Schools, Toronto, has brought to my attention the report of my remarks at the recent Convention of the Ontario Association of Architects.

The rough report of my remarks was looked over very hurriedly, and I am sorry I am quoted as having said, "The ventilation of our schools was criminally neglected."

I have no recollection of using the words "criminally neglected," and certainly would not use them, but I think I was referring in my remarks to some 28 class-rooms which I inspected two years ago, used as a temporary accommodation.

Many of the schools are as regards fresh air well supplied if not overcrowded, and I am glad to learn from Mr. Bishop that arrangements are being made for supplying adequate moisture, and in new schools for mechanical means of ventilation.

I shall be obliged if you will give this note space in your next issue.

Yours truly,

P. H. BRYCE.

ENGINEERS VERSUS ARCHITECTS.

A lively game of curling was played at the Granite rink, Toronto, February 26th, when architects and engineers laid aside their T squares and wielded brooms instead. It was a close game throughout, the following being the score:

Engineers.	Architects.
W. R. Clement	A. H. Gregg
C. B. Smith	A. R. Denison
J. D. Shields	F. H. Herbert
C. H. Rust, skip—10	J. A. Pearson, skip—9.

Mr. W. H. Elliott, of the Elliott & Son Company, the well known decorators of Toronto, accompanied by Mrs. Elliott, is on his way to Europe. His intention is to visit the leading art centres in Great Britain and on the continent.

NOTES.

Mr. H. S. Griffith, architect, of Winnipeg, has recently taken into partnership Mr. Thomas Kennedy.

Mr. F. Neil Brodie has recently opened an office for the practice of architecture at 42 Princess St., St. John, N. B.

Mr. Harry Staveley, the well known architect of Quebec, has taken into partnership his son, Edward B. Staveley, who recently completed a course of study in the architectural department of McGill University, Montreal.

Dr. A. P. Coleman, Professor of Geology at Toronto University, and geologist to the Ontario Bureau of Mines, has been appointed Director of the Geological Survey at Ottawa, in succession to the late Dr. G. M. Dawson.

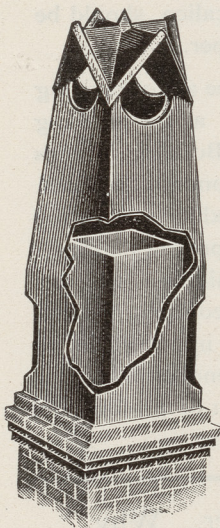
A cable dispatch brings intelligence of the death in action in South Africa of Mr. Frank Douglas of the Oxford Yeomanry, who was formerly a pupil in the office of Mr. D. B. Dick, architect, Toronto, and who has many relatives still residing in that city.

A very pleasant event occurred at St. Thomas a few days ago, when the warden and members of the county council of Elgin waited upon Mr. Darrach, architect of the new county buildings, and presented him with a complimentary address accompanied by a photograph of the new buildings. The committee stated that the result of Mr. Darrach's work had far exceeded their expectations.

Mr. Thomas R. Short, who has been declared the winner of an important competition for model tenement houses for New York, is a native of Hamilton, and was a student in the office of Mr. James Balfour, architect, of that city. Mr. Short has resided in New York since 1885. In the above mentioned competition there were 170 competitors and 308 sets of plans.

According to the Wallpaper News, of New York, a paper that will retain painted or printed characters, and that can be washed, disinfected, or scrubbed, is now made. The paper, either before or after printing, is gelatinized, and then treated with a solution of formaldehyde, which renders it thoroughly waterproof and impervious to moisture. It is especially suitable for wallpaper.

Fire Clay Chimney Top



Specify "Morrison's" Excelsior Chimney Top for low or obstructed chimneys. Same price as brick work. All flue sizes in stock.

Architects

SOLE AGENT
TORONTO
WRITE J. H. MORRISON
84 Harbord Street,



CABOT'S CREOSOTE SHINGLE STAINS

The Original and Standard Shingle Stains are made only by SAMUEL CABOT, of Boston, Mass. Every package bears his trade mark, and every gallon is guaranteed. Used and proved in every climate for nearly twenty years. Also

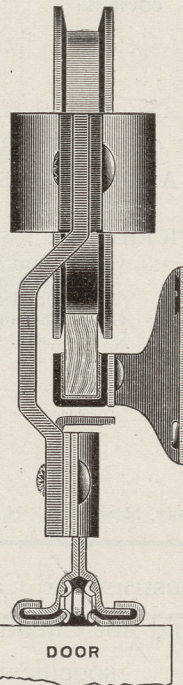
CABOT'S Sheathing and Deafening "Quilt"

the most perfect insulator of heat and deadener of sound on the market. Decay, moth and vermin-proof, and unflammable.

Samples, Catalogue and full information upon application to the manufacturer or his

CANADIAN AGENTS:

ANDREW MUIRHEAD, 82 Bay St., Toronto.
SEYMOUR & CO., Montreal.
C. G. HENSHAW, Vancouver.
F. H. BRYDGES, Winnipeg.
W. H. THORNE & CO., St. John.
E. D. ADAMS Halifax.



No. 5 Poultry Parlour Door Hangers

Antifriction Roller Bearing Noiseless Cushion Track Locked Set Screw Adjustable

\$6.00 per Double Set
\$3.00 per Single Set

THE VOKES HARDWARE CO. LIMITED
TORONTO
SEND FOR CATALOGUE

WIRE LATH

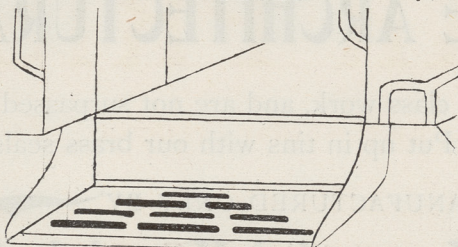
The only perfect Lathing, for the reason that the Wire is completely embedded in Mortar and CANNOT RUST. It is the only Lathing that will stand the test of time.

THE B. GREENING WIRE CO. (LIMITED).

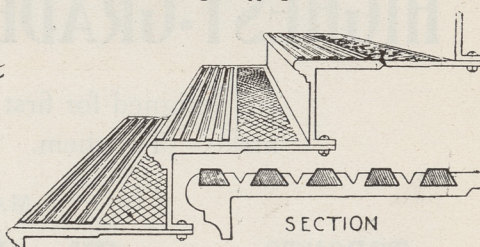
Hamilton, Ont. - Montreal, Que.

A New Idea in Stairs and Car Steps

ARCHITECTS Why not specify The Hamilton Improvement for Stairs and Car Steps, and avoid Accidents through Slipping.



Patented in United States and Canada.
Write or Phone for Particulars.
PHONE 8786.



Patented in United States and Canada.
H. J. HAMILTON, (93 York Street) Toronto, Can.

THE CANADIAN ARCHITECT AND BUILDER

A Monthly Journal of Modern Constructive Methods.

(With a Weekly Intermediate Edition—The CANADIAN CONTRACT RECORD).

PUBLISHED ON THE THIRD WEDNESDAY IN EACH MONTH IN THE INTEREST OF
ARCHITECTS, CIVIL AND SANITARY ENGINEERS, PLUMBERS,
DECORATORS, BUILDERS, CONTRACTORS, MANUFACTURERS OF AND DEALERS IN BUILDING
MATERIALS AND APPLIANCES.

The C. H. MORTIMER PUBLISHING CO. of Toronto, Limited.
Publishers,

Confederation Life Building, - TORONTO, CANADA.

Telephone 2362.

Branch Office ; IMPERIAL LIFE INSURANCE BUILDING, MONTREAL.
Bell Telephone 2299.

SUBSCRIPTIONS.

THE CANADIAN ARCHITECT AND BUILDER will be mailed to any address in Canada or the United States on the following terms : Architect's Edition, \$3.00 per year ; Regular Edition, \$2.00 per year. The price to foreign subscribers is : Architects' Edition, 16 shillings ; Regular Edition, 12 shillings. Subscriptions are payable in advance. The Journal will be discontinued at expiration of term paid for, if so stipulated by the subscriber ; but where no such understanding exists, will be continued until instructions to discontinue are received and all arrears of subscription paid.

ADVERTISEMENTS.

Prices for advertisements sent promptly on application. Orders for advertisements should reach the office of publication not later than the 12th, and changes of advertisements not later than the 5th day of the month.

EDITOR'S ANNOUNCEMENTS.

Contributions of value to the persons in whose interest this journal is published are cordially invited. Subscribers are also requested to forward newspaper clippings or written items of interest from their respective localities.

Subscribers who may change their address should give prompt notice of same. In doing so, give both old and new address. Notify the publishers of any irregularity in delivery.

ONTARIO ASSOCIATION OF ARCHITECTS.

OFFICERS FOR 1901.

PRESIDENT	-	GRANT HELLIWELL, Toronto.
1ST VICE-PRESIDENT	-	F. S. BAKER, Toronto.
2ND VICE-PRESIDENT	-	JOHN A. PEARSON, Toronto.
TREASURER	-	W. A. LANGTON, Toronto.
REGISTRAR	-	W. R. GREGG, 94 King St. West, Toronto.

COUNCIL:

FRED HENRY	-	-	-	-	London.
A. H. GREGG	-	-	-	-	Toronto.
LAWRENCE MUNRO	-	-	-	-	Hamilton.
EDMUND BURKE	-	-	-	-	Toronto.

PROVINCE OF QUEBEC ASSOCIATION OF ARCHITECTS.

OFFICERS FOR 1901.

PREIDENT	-	G. E. TANGUAY, Quebec.
1ST VICE-PRESIDENT	-	J. VEENE, Montreal.
2ND VICE-PRESIDENT	-	W. E. DORAN, Montreal.
SECRETARY	-	G. A. MONETTE, Montreal.
TREASURER	-	J. S. ARCHIBALD, Montreal.

COUNCIL.

PROF. S. H. CAPPER	-	-	-	-	Montreal.
A. T. TAYLOR	-	-	-	-	Montreal.
ALCIDE CHAUSSE	-	-	-	-	Montreal.
E. MAXWELL	-	-	-	-	Montreal.
A. H. LAPIERRE	-	-	-	-	Montreal.
J. P. OUELLET	-	-	-	-	Quebec.

AUDITORS—C. DUFORT, Montreal ; J. H. LEBON, Quebec.

TORONTO BUILDERS' EXCHANGE.

BOARD OF DIRECTORS :

THOS. CHRISTY, President.
JAMES B. THOMSON, 1st Vice-President.
JOSEPH RUSSELL, 2nd Vice-President.
DAVID WILLIAMS, Treasurer.
R. G. KIRBY.
J. M. FAIRCLOTH.

JAS. CRANG.
JOHN LOGAN.
GEO. DUTHIE.
W. J. HYNES.
BEN. BRICK.
JOHN VOKES.
WM. PEARS.

LONDON BUILDERS' EXCHANGE.

BOARD OF DIRECTORS :

THOS. JONES, President.
JOHN NUTKINS, 1st Vice-President.
GEO. HOWE, 2nd Vice-President.
GEO. S. GOULD, Secretary-Treasurer.

WM. TYTLER.
E. FITZGERALD.
ED. MARTYN.
JOHN WHITTAKER.
WM. JEFFERY.

MONTREAL BUILDERS' EXCHANGE.

BOARD OF DIRECTORS :

C. T. WILLIAMS, President.
J. W. HUGHES, Vice-President.
G. J. SHEPARD, Secretary-Treasurer.
JOHN WIGHTON.

H. R. Ives.
JAMES PATON.
N. T. GAGNON.
JOSEPH LAMARCHE.

WINNIPEG MASTER CARPENTERS' ASSOCIATION.

BOARD OF DIRECTORS :

A. MACDONALD, President.
A. G. AKIN, 1st Vice-President.
A. SUTHERLAND, 2nd Vice-President.

H. ELLIOTT, Secretary.
J. G. LATIMER, Treasurer.

VANCOUVER BUILDERS' EXCHANGE.

BOARD OF DIRECTORS :

E. COOK, President.
A. E. CARTER, Secretary.
H. A. BELL, Treasurer.
T. BRADBURY.

C. P. SHINDLER.
K. M. FRASER.
E. G. BAYNES.
D. SAUL.

A company has applied to Congress for leave to lay underground pipes in the streets of Washington, the U.S. capital, for the purpose of distributing cool air through residences and business establishments. The air will be pumped through a refrigerating plant.

To canvass a room cover the matchboards with strong calico known as Bolton twill, fastening all round the edges with copper tacks an inch or two apart. Stretch as tightly as possible. When fixed, apply a coat of very strong size. For a good job the calico should be interlined before putting on the wall paper.

The British Fire Prevention Committee are organizing a novel demonstration in the form of a fire-proofing section in connection with the Biennial Building Trades Exhibition at the Agricultural Hall, London, in April. A large gallery has been retained for exhibits showing progress made in combating fire by improved materials and systems of construction. This exhibition will not only be the first of its kind in any country, but will show that the reduction of fire risk by improved forms of building has now its own independent industrial position, claiming not only the attention of professional men but the study of our local authorities.

Canadian Industries and Canadian Products are taking the lead the world over. Why should not Canadian Varnish do so at home ? When making out the specifications for your next building, remember that

The Imperial Varnish & Color Co.'s Limited

HIGHEST-GRADE ARCHITECTURAL VARNISHES

are designed for first class work, and are not surpassed by any of a foreign make. Try them. Put up in tins with our brass seals. :: :: :: :: ::

MANUFACTURED ONLY BY

TORONTO
Ontario, - Canada



The Imperial Varnish & Color Co., Limited



From The Builders' Journal and Architectural Record.

W. LEE CLARKE, Architect.

Galvanized Iron Goods

Corrugated Conductor Pipes and Elbows.
Corrugated Sheets, all sizes.
Eavetroughs, all sizes and styles.
Cornices, Skylights, &c.

WHEELER & BAIN - TORONTO

EXAMINATION TO Qualify for Associateship IN THE Royal Institute of British Architects

The Royal Institute of British Architects, desiring to give facilities for those in the Colonies, to qualify by Examination for Associateship in the R. I. B. A., have decided to hold an Examination from June 21st to 27th, 1901, in Montreal. Applications, fees, and Probationary work must be sent to London not later than May 5th, 1901. Intending candidates, who must be over 25 years of age, can obtain application forms and copies of the previous examinations on application to

ANDREW T. TAYLOR,
Hon. Secy. R. I. B. A. for Canada,
43 St. Francois Xavier St.,
Montreal.

NOTE.—Those who are members of recognized architectural associations who have passed the regular final examinations appointed by such associations, are exempted from submitting probationary work, but evidence of passing such examination must be given.

BEAMSVILLE
BRICK
&
TERRA-COTTA CO.

SPECIALTY
A Peerless Pressed Brick of all forms and
Colors required **RED-BROWN-BUFF**

PROMPT DELIVERY HEAD OFFICE & WORKS
BEAMSVILLE, ONT.
GEORGE CRAIN, Proprietor.

FIRE-PROOF GLASS WINDOWS

THAT
ARE
FIRE-PROOF

These windows in a fire-proof building, complete the security, and in any building will thoroughly prevent the spread and advancement of the fiercest flames.

Better than iron shutters (even if they happened to be closed at the needed time); fire-proof glass remains intact, resisting both the intense heat of the fire and the action of water.

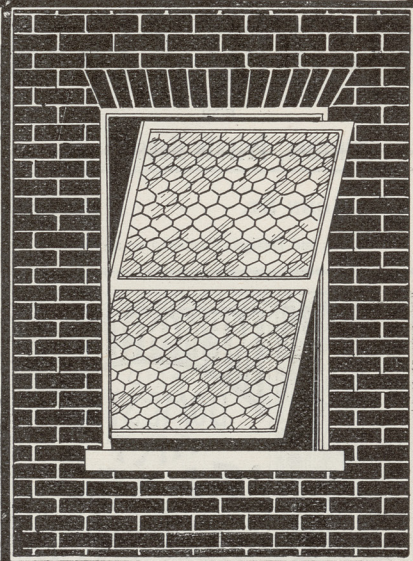
Many practical tests have proved it's efficiency.

Used in conjunction with our hollow sheet-metal frames and other fire-proof fittings, it gives the most perfect protection available.

It's adoption lessens insurance rates.

If you want to know more about "fire-proof windows," write us, it's an interesting subject.

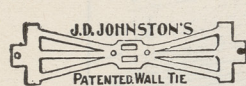
... THE ...
Metallic Roofing Co.,
TORONTO. LIMITED.



The ruinous competition which has long prevailed between the cement manufacturers in Southern Germany and those of Switzerland, is likely to be brought to a close by a proposed agreement between the Swiss Syndicate and South German Cement Manufacturing Syndicates by which the former will cease to complete

for German trade and the latter will no longer export to Switzerland.

Mr. W. T. Dalton, a well known British Columbia architect, has recently returned from a three months visit to England, New York and Boston.



1-16-inch thick made of steel galvanized, can be bent or twisted to any shape, thin enough for fine joint, strong enough for any purpose, the best tie for brick or stone walls nothing better for fastening brick or stone veneer to wood buildings. Sample free. Agents wanted.

J. D. JOHNSTON, Newport, R.I., U.S.A.

Glass Painting....
Memorial Windows

MCKENZIE'S STAINED GLASS WORKS

8 AND 10 MAIN STREET EAST

Church and Domestic
Ornamental Glass. Hamilton, Ont.
Original Designs made to suit all classes of work.

**MCGAUSLAND STAINED
GLASS CO., LIMITED**

87 King Street West, TORONTO

Decorative Leaded Glass

Superior Metallic Glazing

Memorial Figure Windows

**.. HENRY BLOOMFIELD & SON..
ART GLASS WORKERS**

BOX 414 - VANCOUVER, B.C.
SKETCHES AND PRICES ON APPLICATION.

ART GLASS WORKS

ESTABLISHED 1876.

Memorial Church Windows,
Geometrical and Quarrie Windows,
Art Glass for Residences, etc.

Send for designs and prices to

H. HORWOOD & SONS PRESCOTT, ONT.,
98 Bank Street, and Ogdensburg, N.Y.
OTTAWA.

B. LEONARD

MANUFACTURER

STAINED GLASS

FOR

Churches, Private Houses, Etc.

53 ST. JOHN ST. - QUEBEC

Estimates and Designs furnished on application.



THE CANADIAN PORTLAND CEMENT CO., LIMITED

Works: STRATHCONA, ONT. MARLBANK, ONT.

ST. LAWRENCE PORTLAND CEMENT COMPANY

MONTREAL

..... MANUFACTURE

"RATHBUN'S STAR" "BEAVER" "ENSIGN"

BRAND

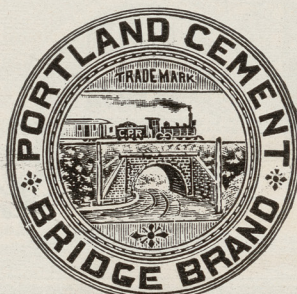
BRAND

BRAND

For Prices Write THE RATHBUN COMPANY, Deseronto, Ont.

Sole Sales Agents

PORTLAND CEMENT



Calcined Plaster

Sewer Pipes

Fire Bricks

Fire Clay

Baker's Plaster Board

ALEX. BREMNER, Importer Building Supplies
50 Bleury Street, MONTREAL

**The Owen Sound Portland Cement
Company, Limited**

WORKS AT . . .
SHALLOW LAKE, ONT.

Over 39,000 barrels of our SAMSON BRAND PORTLAND CEMENT sold during 1895, and not a single complaint received as to its quality.

[The City of Toronto have contracted with us to supply our SAMSON BRAND PORTLAND CEMENT for the requirements of the whole city for 1897 and 1898.]

Can you wish any better recommendation?

Canada can produce as good Portland Cement as made in the world, and we are making it.

We guarantee the quality to be equal in every respect to the best imported brands from England and Germany.

SIDEWALK CEMENT A SPECIALTY

For testimonials, prices and further information,
apply to the Manager, Shallow Lake, Ont., or to
Correspondence Solicited

JOHN LUCAS
377 Spadina Ave, TORONTO



METAL CEILINGS



METAL BUILDING MATERIAL

Have recently added many new and elaborate designs in Metal Ceilings and Side Walls, and will be pleased to send samples and blue prints upon receipt of particulars.

Ask for samples of our Galvanized Roofing and Siding.

THE METAL SHINGLE & SIDING CO.
PRESTON ONT.

NOTES.

The bricks for the first brick house in Philadelphia, built by William Penn, were brought from England at a cost of £5,000.

Alex. M. Bremner, of Montreal, has issued a neat calendar, the dates being in bold figures. The margins are utilized to direct attention to the many lines of building materials for which Mr. Bremner is the wholesale agent.

An amendment is being sought to the charter of the McClarey Manufacturing Company, London, Ont., to allow the Company to manufacture and deal in hardware, and to increase its capital stock to \$3,000,000.

Mr. P. W. St. George, late City Engineer of Montreal, has been appointed manager of the Electric Fire Proofing Company of Canada. This Company have recently erected in Montreal a factory for treating wood by a process which it is said renders it fireproof. Wood treated by this

process is said to have successfully withstood severe tests by fire in the United States and Europe.

The Toronto Harbor Board have recently reduced the harbor toles from 33 to 50 per cent. The reduction on stone, rough, from 10 cents to 5 cents per toise; on building stone from 3 cents to one cent; on fire and scoria bricks, from 10 cents to 5 cents; on lumber, from 5 cents to 3 cents per thousand board measure.

As the result of the decision of the bond holders to freeclose their mortgage on the property of the Victoria Gypsum Mining and Manufacturing Co. Limited, at Bodeck, Nova Scotia, there will be thrown on the market a gypsum area of over seven thousand acres in close proximity to the Deep Water Spring Break-water, containing all grades of gypsum, from pure white alabaster to the hard rock.

Application has been made to the City Council of Toronto by Dr. J. E. Elliott for

payment of royalty on the imitation of marble used for covering of columns in the interior of the new municipal buildings. Dr. Elliott claims to be the owner of the patent process used in the preparation of the material. Mr. T. W. Horn, as assignee of the Mosaic Marble and Enamel Company has issued a writ against the city, Fred. R. Gullett, the Dominion Bridge Company and the Davidson Marble Company to recover payment of \$1,589.78 claimed to be due on the marble work in these buildings, the total cost of which was \$30,000.

Every Architect
is Safe in Recommending

PAINTERS PERFECT WHITE LEAD



MANUFACTURED BY THE LATEST AND
MOST APPROVED METHOD, SECURING
WHITENESS, PERMANENCE, AND THE
GREATEST COVERING POWER.

This lead is a new and scientific combination of materials which are in themselves perfect pigments, ground in pure refined Linseed Oil. It will be found on trial to be the whitest Lead ever introduced, besides which it has great covering power, works well under the brush, and shows up tints sharp and clear. In thinning, it takes more Oil than any other Lead, and will, therefore, cover more surface. It will also wear better either on inside or outside work than any other paint ever offered before.

Correspondence Solicited.
Samples furnished free.

Address the Sole Makers

THE . . .

CANADA

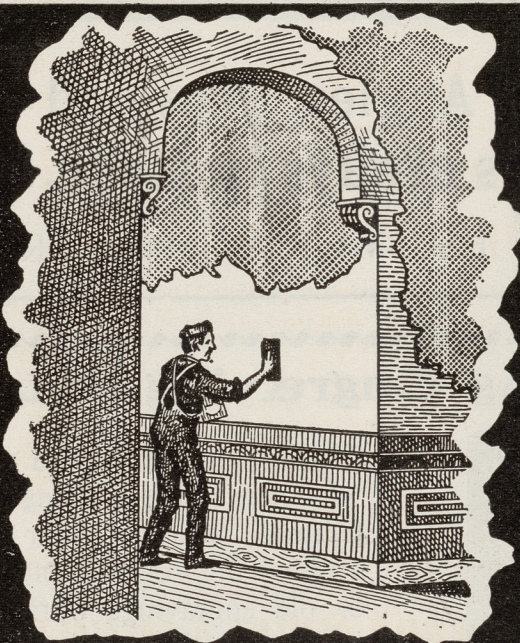
PAINT

COMPANY

LIMITED

Montreal and Toronto

THE PEDLAR PEOPLE



Plaster on Steel Lath

Pedlar's Expanded Steel Lath has a good key.

That's its strong point.

The mesh is very open.

That's what makes it's key so good.

Takes more mortar than others, to be sure, but this is an advantage, as the open mesh allows enough mortar to pass through to completely embed the lath, making it entirely fireproof.

Have you one of our large Catalogues?

Gladly sent—express paid—on request, by mentioning the "Canadian Architect."

OSHAWA ONT.

ARMoured CEMENT.

ARMoured cement seems destined to play an important role in the twentieth century construction. The bold conception of building the new church, St. Jean de Montmartre, Paris, with this material will be a new departure in modern construction. No doubt the catastrophe at the Paris Exhibition, where this kind of cement was somewhat extensively employed, decided the public authorities to test the upper flooring of the edifice. The experiments were made on planking of five centimetres (1.965 in.) thick, which were charged to support a weight of 600 kilos. (1,322 lb.) to the square metre, that is to say, about four times the weight of a multitude of persons. Tests were placed in the crypt to register

the degrees of bending under the action of the dead-weight. The tests, after examination, did not show the slightest inflexion and the construction of the church will be completed. MM. Cottancin, engineer of arts and manufactures; DeBaudot, inspector-general of diocesan edifices, architect of the church, as well as the Abbe Sobaux, vicar of the new parish, and several engineers and architects were present at the trials, which were of the most minute description.

The McClary Manufacturing Company, of London, are about to open a branch office at St. John, N.B., in charge of Mr. John Foot.

Canada Foundry Company

TORONTO, ONT.

Limited

(SUCCESSORS TO ST. LAWRENCE FOUNDRY COMPANY OF TORONTO)

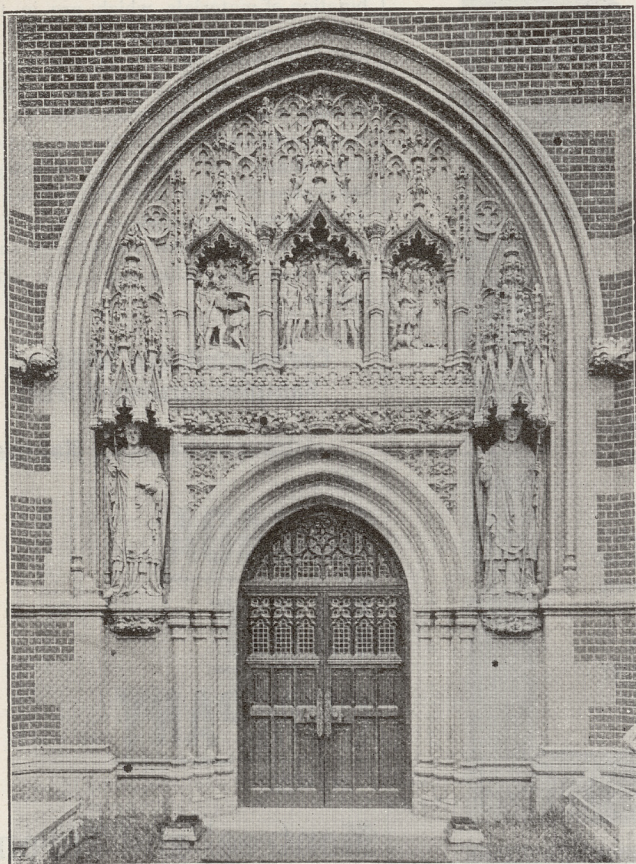
Engineers, Founders and Machinists

STRUCTURAL IRON AND STEEL WORK

Beams, Channels, Angles, Tees and
Cast Iron Columns always in stock.

WRITE OR 'PHONE FOR ESTIMATES AND PRICES

Canada's Leading Engraving House



HALF-TONE REPRODUCTION FROM AN ENGRAVING.

OUR long and varied experience in reproducing architectural work, either from original drawings, photographs or old engravings warrants us in guaranteeing ...

Perfect Satisfaction

THE LEADING ARCHITECTS in Canada use our Engravings. They pronounce them equal to the best in the world.

Moore & Alexander

ENGRAVERS AND
DESIGNERS ...

16 Adelaide Street West, TORONTO

'Phone 2158.

ALBERT MANUFACTURING CO.

MANUFACTURERS OF

MANUFACTURERS OF

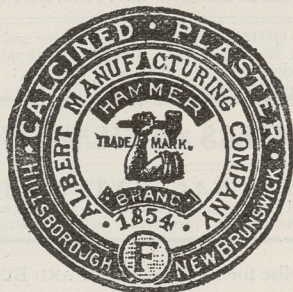
PATENT

"HAMMER BRAND"

ROCK WALL PLASTER

CACLINED PLASTER

HILLSBOROUGH, N. B., CANADA



DIRECTORY OF LEADING STONE AND GRANITE DEALERS

Amherst Red Stone Quarry Co.
AMHERST, N. S.
Amherst Red Stone
*Samples Sent Free Hardens with Age
Correspondence Requested*

C. PICKARD
BROWN STONE
LARGE DIMENSION STONE
A SPECIALTY
SACKVILLE, N. B.

JOHN KLINE
—DEALER IN—
ROUGH AND DRESSED GRANITE
Heavy blocks a specialty. Street paving and curbing. Also granite for monumental and building purposes. Estimates and samples on application.
JOHN KLINE, Granite Dealer, HALIFAX, N.S.

GRANITE
Red and Rose Pink
Fine Rich Colours for
BUILDING and MONUMENTAL PURPOSES
and GRANITE PAVING
can be had at low figures from the
St. Phillippe d'Argenteuil Quarries.
Send for quotations and samples to
JOS. BRUNET
Cote des Neiges, Montreal, Que.

MOAT RED—Sand Stone.
BLACK PASTURE—Buff.
NOVA SCOTIA—Blue Grey.
BATH—Box Ground Grey.
Selling Agents for Canada—
Thos. Samuel & Son,
A. G. MOONEY, Manager,
Telephone Main 2448. Temple Bldg., MONTREAL.

JAMES BRODIE & CO.
Quarriers and Manufacturers of . . .
*Canadian Quinsy, Ebony
and Stanstead Granite*
Monumental Building, Curbing, Paving, etc. - Rough Stock a Specialty.
Mount Johnston, Que.

BROWN AND OLIVE
FREE STONE
Any dimensions and finest quality, for BUILDING PURPOSES, from our New Brunswick quarries.
Pulp Stones
SAMPLES ON APPLICATION
WM. HOOD & SON
10 Richmond Sq. MONTREAL

D. ROBERTSON & CO.
Credit Forks Quarries.
BROWN AND GREY
FREESTONE
Sills, Heads, Coursing and Dimension Stone our Specialties. Lime Works at Milton, Ont.
Offices: Toronto, Credit Forks and Milton

For Prices of Unoccupied Spaces in the above Directory address the CANADIAN ARCHITECT AND BUILDER, Toronto.

CREDIT FORKS STONE CO.

84 Adelaide St. W.

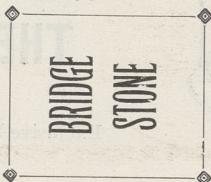
TORONTO

Brown Stone Quarries,
✠ ✠ ✠ **Credit Forks, Ont.**

Supply the
Best . . .

BROWN STONE IN . . CANADA

DIMENSION COURSING
RANDOM SHODDY
HEADS, SILLS RUBBLE



OFFICE:
84 Adelaide St. W.
TORONTO
Telephone 208.

Classified Directory of Montreal Contractors and Dealers in Builders' Supplies

BUILDING MATERIALS

E. F. DARTNELL.
Stone, Pressed and Common Bricks, Mineral Wool, etc.
Telephone 2382. 180 St. James Street.

T. A. MORRISON
Pressed and Paving Bricks, Porous Terra Cotta, Stone, &c. Telephone 2147. 118 St. Peter Street.

GEO. A. COWAN,
Building Supplies,
Telephone 2463. Office, 59 Temple Building.

JAS. W. PYKE & CO.
Importers Structural Material—Iron and Steel
Telephone 312. Merchants Bank Bldg.

BUILDERS and CONTRACTORS

JOHN QUINLAN, General Contractor and Builder,
679a Wellington St., Montreal. Estimates given
on all kinds of Cut Stone and Masonry; Jobbing
promptly attended to. Bell Telephone 8275.

PLUMBERS and STEAMFITTERS

JAMES BALLANTYNE & CO.
Practical Plumbers, Gas, Steam and Hot Water Fitters,
153 St. Antoine St., Montreal. Bell Telephone 2462.

Subscribe for the ARCHITECT AND BUILDER.

PAINTERS and DECORATORS

JOHN B. OWENS
House, Sign and Decorative Painter; Paper Hanger.
Natural Wood Finish a Specialty.
Bell Telephone No. 2237. 117 Bleury Street.

ROOFERS

D. NICHOLSON & CO., Roofers, 679 St. Paul
Street, Montreal. Gravel Roofing a Specialty.
Repairs of all kinds promptly attended to.
Bell Telephone 1665.

Write for prices for a card in
this Directory.

Classified Directory of Toronto Contractors and Dealers in Builders' Supplies

BUILDING MATERIALS

GEORGE RATHBONE, 2 Northcote Ave. Pine,
Hemlock and Hardwood Lumber; Lath, Shingles
and Cedar Posts; Sawn Veneers. Re-sawing up to 30
inches wide a specialty.

Ontario Lime Association

Manufacturers and Dealers in
Grey Lime, Guelph White Lime,
Ontario Cement, Portland Cements
Plaster Paris, Hair, Fire Brick,
Fire Clay, Sewer Pipe, etc.
Telephone 920. 118 Esplanade St. E., Toronto

BUILDERS and CONTRACTORS

JAS. NURSE, BUILDER. Estimates given on all
kinds of Brick and Stone Work, Cement Walks,
Curbs, and Cellar Floors. 22 SALISBURY AVE.,
TORONTO.

GEORGE OAKLEY. **FREDERIC HOLMES.**
AKLEY & HOLMES, Contractors
Telephone 1830. 1111 Yonge St., TORONTO.
Estimates given for Cut Stone, Brickwork, Etc.

MANTLES, GRATES and TILES

Toronto Hardware Mfg. Co.
1100 Queen St. W.
ALSO PLUMBERS' SUPPLIES.

MOVERS

I. WARDELL & SON
450 Spadina Avenue,
Move Frame and Brick Houses and Machinery.

ROOFERS

ROBT. RENNIE & SON,
Terra Cotta Tile,
SLATE AND GRAVEL ROOFERS, &c.
Every description of Roofing Slate always on hand.
Galvanized Iron Ridges, Valleys and Flashings supplied.
Telephone 2344. 378 Berkeley St., TORONTO.

H. WILLIAMS & CO.,
23 Toronto St. TORONTO.
ROOFERS
With Slate, Felt and Gravel; also Williams' Flat Slate
Roof—the best. We lay ROCK ASPHALT on cellar
bottoms, floors and walks—the best material for this
work. Telephone No. 511.

W. T. STEWART & CO.
Felt and Slate Roofers,
Dealers in Felt, Pitch, Tar, Sheathing Paper, Carpet
Paper, and all kinds of Building Paper.
Office: Cor. Adelaide and Bay Sts., TORONTO.
Estimates furnished. Telephone No. 698.

G. DUTHIE & SONS,
Terra Cotta Tile, Slate and Felt Roofers,
Cor. Widmer and Adelaide Sts., - TORONTO.
GALVANIZED IRON FURNISHINGS SUPPLIED.
Telephone 1936.

ESTABLISHED 1856
Slate and Felt Roofing.
FORBES ROOFING CO. 153 Bay St.

ABRAHAM SNYDER, ROOFER.—Every de-
scription of Gravel and Shingle Roofing. Shingle
Roofs painted and repaired. All work fully guaranteed.
Office, 114 Westmoreland Avenue.

DOUGLAS BROS

SLATE, TILE AND METAL ROOFERS.
Sheet Metal Work, Metallic Ceilings, Skylights, etc.
124 Adelaide Street West, TORONTO.
Telephone 360.

PIONEER GALVANIZED IRON WORKS
ESTABLISHED 1855.

GEORGE RINGHAM
23 and 25 Edward Street, TORONTO
Copper and Galvanized Iron Cornices,
Skylights, Etc., Metal Ceilings
Felt and Slate Roofing, Phone 2572.

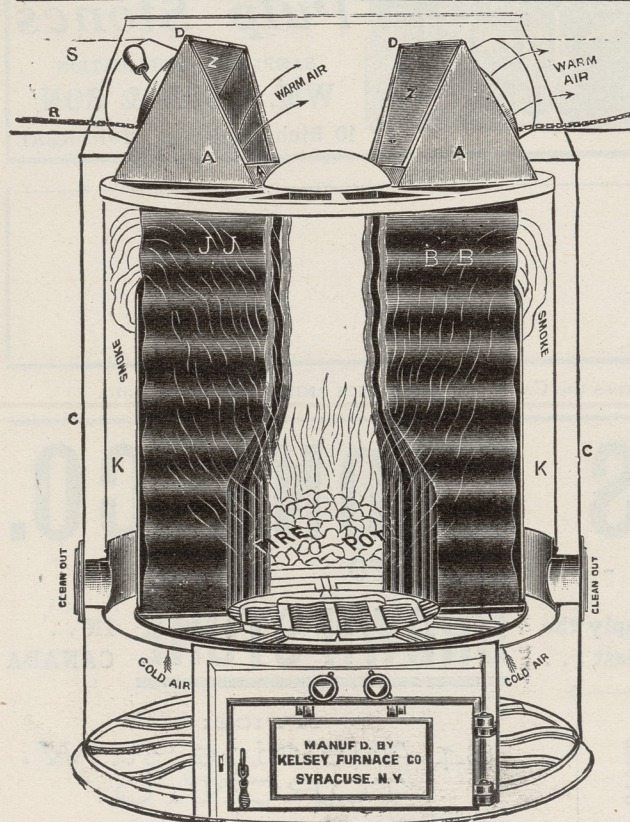
HEATING and VENTILATION

GEO. E. YEOMAN & CO.
Mfrs. "ROYAL" Warm Air Furnace.
Telephone 2034. 279 Queen St. W.

PLUMBERS and STEAMFITTERS

BATES & ROBINSON
Plumbing, Steam and Hot Water Heating; Outside
Work a Specialty. 385 Spadina Ave., Telephone 1721.

Advertise in the ARCHITECT AND BUILDER



KELSEY WARM AIR HEAT MAKERS

FUEL SAVERS GENERATORS (PTD)

Will Positively Warm Rooms

Long distances from or on a level with the Generator.

This cut shows the "Patented Positive Cap Attachment" located over two of the long, hollow, corrugated sections. By extending a pipe from this "Positive Cap Attachment" the warm air coming through these particular sections must be delivered in the rooms thus connected.

By the closing of the damper Z the flow of warm air can be diverted into the general Warm Air Reservoir.

THE KELSEY is not in the same class as the ordinary Hot Air Furnace.

THE KELSEY has three times as much Heating Surface and three times as much Air Capacity; therefore more economical and much better adapted to the Warming and Ventilating of Schools, Churches and Large Residences.

OVER 1500 KELSEYS in use in the City of Syracuse, N.Y.

Our printed matter tells all about them.

THE JAMES SMART MFG. CO.
LIMITED

Exclusive Makers for Canada

BROCKVILLE, ONT